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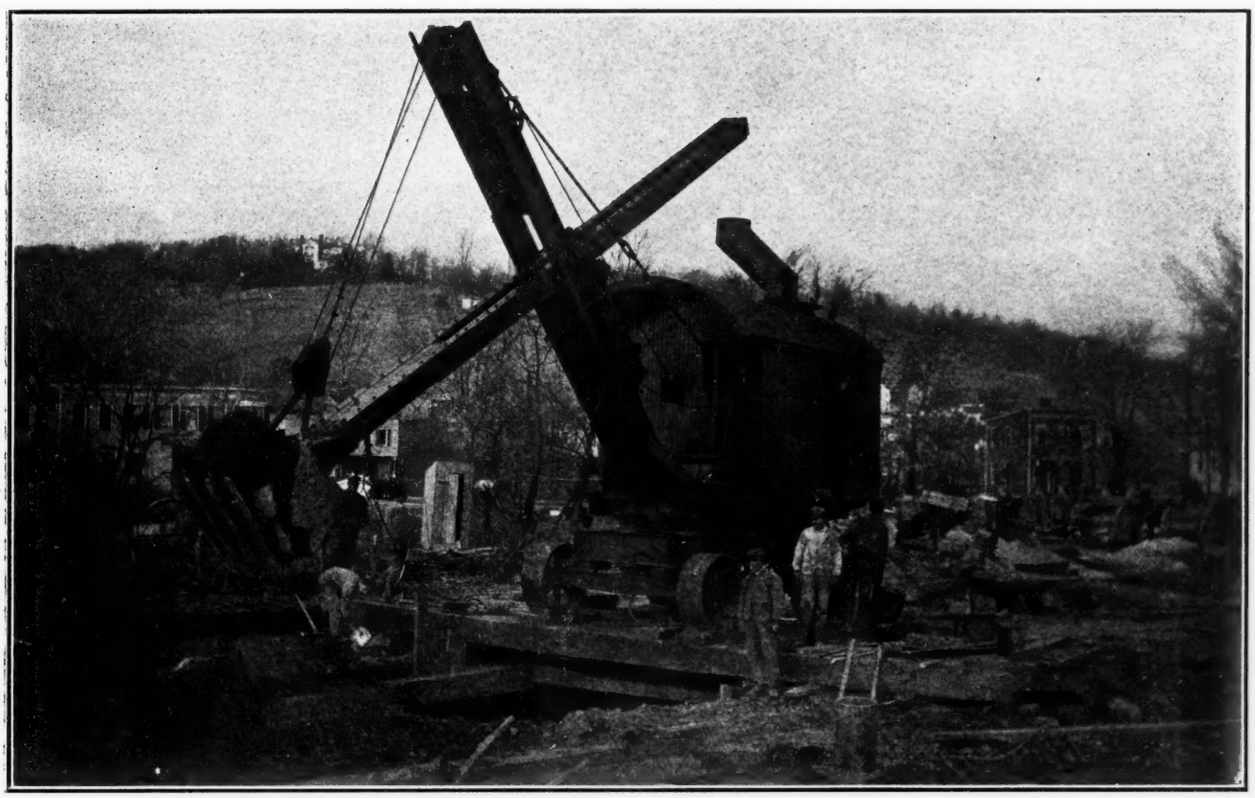


STEAM SHOVEL DIGGING SEWER TRENCH SIXTEEN FEET DEEP
12 x 12-inch Sheeting Ranger Extending Ahead of Platform; Most Forward Brace Under Platform

TRENCH EXCAVATION BY STEAM SHOVEL

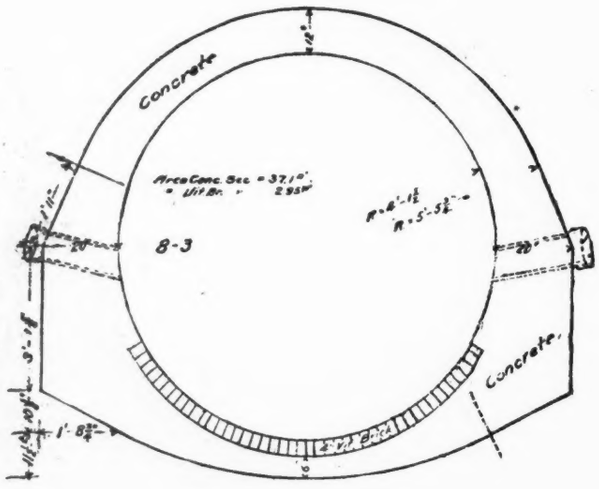
Adaptable to Any Trench in Firm Soil Six Feet or More Wide—Method of Sheeting—Details of Plan Adopted for Sewer Work on Staten Island—Handling Ground Water

THE various communities which go to make up the Borough of Richmond, New York, otherwise known as Staten Island, are in general sewered upon the combined system. Owing to the fact that the borough covers the entire island, and that this is highest in the center, the sewerage problem in general is a simple one, as the territory is divided into numerous small drainage areas, each with its outlet at a convenient point along the shore.

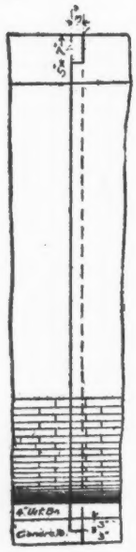
One of these districts where construction is now under way has its outlet into New York harbor at a municipal dock. A few hundred feet back from the shore the combined sewer is divided into a storm and a sanitary sewer by gradually dropping the invert of the combined sewer and leading it into the sanitary sewer, the surplus sewage after this is filled passing into the storm sewer. The latter discharges at the bulkhead line, while the sanitary sewer, which is 3 feet in diameter, is continued as a wood stave pipe under the pier, being supported from the piles, and discharges at its outer end, which is something more than 1,300 feet from the bulkhead line. This sewer has been constructed for about 1½ miles back from the outlet, where construction is now under way in a manner somewhat novel, in this section of the country at least.

The sewer at this point lies in a stretch of Targee

street which has not yet been opened up, the ground surface still being sod in most places. The sewer here is circular in cross section, 8 feet 3 inches in diameter; but it varies in diameter at different points in the present contract from 7 ft. 9 in. to 8 ft. 9 in. The contract also includes several egg-shaped sewers varying from 1 ft. 8 in. by 2 ft. 6 in. to 6 ft. 6 in. by 9 ft. 9 in. This sewer is built of concrete without reinforcement, the bottom third of the circumference being lined with vitrified sewer brick 4 in. thick. The concrete shell is 12 in. thick at the crown and around nearly to the springing line, enlarging to 20 inches at the latter point, below which the outer sides are vertical for 3 ft. 1½ in. The invert is 10 in. thick, 4 in. brick and 6 in. concrete, and the under side is a circular arc with a radius of 9 feet. House connections are inserted at the springing line at frequent intervals, these consisting of 6-inch vitrified pipe slants. At a few places along the line of the sewer the soil is somewhat soft and a timber cradle is used; but throughout most of



SECTION OF 8 FT. 3 IN. SEWER.



LONGITUDINAL SECTION OF EXPANSION JOINT.

the length the soil is rather stiff red clay with occasional intermingling of gravel and sand, and no foundation is required, but the concrete is laid directly upon the soil.

The engineer's estimate for the cost of this work was $168,431, several of the items being as follows: 8 ft. 9 in. circular sewer, $25.20 per foot; 7 ft. 9 in. circular sewer, $21.90 per foot; 6 ft. 6 in. by 9 ft. 9 in. egg-shaped, reinforced concrete sewer, $22.10 per foot; 1 ft. 8 in. by 2 ft. 6 in. egg-shaped, reinforced concrete sewer, $5.20 per foot; 8-inch underdrain, 25 cents a lineal foot. The bid of the successful contractors, Joseph Johnson's Sons, of West New Brighton, Staten Island, was $150,771.88. The contract comprises 2,984 feet of circular concrete sewer and 4,968 feet of egg-shaped sewer of various sizes. In addition there are numerous items, such as 45 manholes, 40 basins, 5,900 feet of underdrains, sheathing left in trench, additional excavation, etc., and restoring about 3,700 square yards of pavement.

The concrete sewer is made with expansion joints spaced 50 feet apart, formed by leaving an annular socket in the end of the concrete construction at these points, this socket being 3 inches deep, and leaving a bell varying in thickness from 3 inches at the bottom to 11 inches at the haunches and 7 inches at the crown. This joint is carried through the brick work also. Before constructing the following section of sewer the surface of this joint is painted with hot roofing tar, which sets with a smooth hard surface before the concrete of the following section is placed.

The general design of the sewer and its appurtenances contains few novel features, and it is the construction which is the special reason for preparing this description. The excavation of the trench is being done by the use of a steam shovel. The entire gang engaged in excavating the trench, which is about 13 feet wide and 15 to 22 feet deep, consists of but eight men, two of whom operate the steam shovel. The steam shovel is mounted on a four-wheel truck, which in turn rests over the center of the trench upon a platform of twenty 12 x 12 timbers laid side by side across the trench. As the steam shovel moves forward the 12 x 12 timbers from the rear of the platform are brought forward and placed at the front end. Two-inch plank are laid along the sides of the trench upon the surface of the ground to assist in keeping the platform timbers at a uniform elevation.

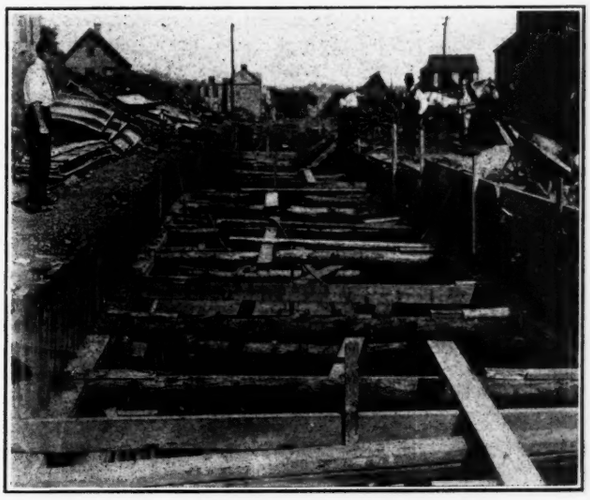
The steam shovel is one manufactured by the Thew Automatic Shovel Company, of Lorain, O., and carries a dipper whose working capacity is about one-half cubic yard, and is so arranged that the dipper handle can be dropped into a vertical position and reach the bottom of the trench, 22 feet below the surface. In excavating, the dipper, of the ordinary steam shovel type, is drawn up the dirt slope at the forward end of the trench, which has an angle of about 45 degrees, and when filled discharges its load into an ordinary dump cart on the bank, by which the dirt is carried back and dumped onto the completed sewer. The operator is able to excavate the bottom of the trench very close to the desired grade, the final and exact surfacing being done by two men with pick and shovel, who cast the dirt forward to be taken up by the steam shovel. The shovel also excavates quite close to the desired side of the trench, the final trimming being done by two other men. Although the soil is a fairly stiff clay which stands up well, it is not thought best to rely upon this stability to any considerable extent, but sheeting is placed as soon as a depth of 6 or 8 feet is reached; that is, about one-half way up the sloping forward end of the trench. This was considered especially desirable at the point where the excavating was being done in December, as a water main had been laid 6 or 8 feet from the trench only a few months before, and the undisturbed soil between its trench and that under construction did not offer sufficient guarantee against caving. The other two men of the gang are employed in placing and driving the sheeting, and in odd jobs.

It is, of course, impossible to place braces across the trench at the point where excavation is going on, as these would prevent the use of the steam shovel. In order to meet this difficulty the contractor uses four 12 x 12 timbers 20 to 24 feet long, placing two on each side as sheeting rangers, one about 2 feet below the surface and the other 8 or 10 feet below. These are moved forward from time to time to the end of the excavation, and act as cantilever beams, being held apart by braces, the most forward of which is far enough back to avoid any possibility of its being struck by the dipper handle of the steam shovel. Under the conditions existing in this work, these beams are found to be stiff enough to hold up the bank for 10 or 12 feet ahead of the brace. Sheeting planks are slipped behind these beams as the excavation advances, and are driven down as the forward earth slope deepens. From time to time ordinary 4 x 8 rangers with their braces are placed between the sheeting planks so that the 12 x 12 beams can be moved forward. In the trench in general, ordinary timber braces are used, but the braces

between the 12 x 12's, which are frequently moved, are provided with extension ends. A trench about 2 feet deep by 18 inches wide is dug for 50 feet or so ahead of the trench along each side line of it in advance of the excavation, both to give a definite and solid edge to the trench and prevent the breaking of the edge of the bank by the steam shovel, and also to permit a pair of the heavy rangers to extend into these in advance of the excavation, if desired.

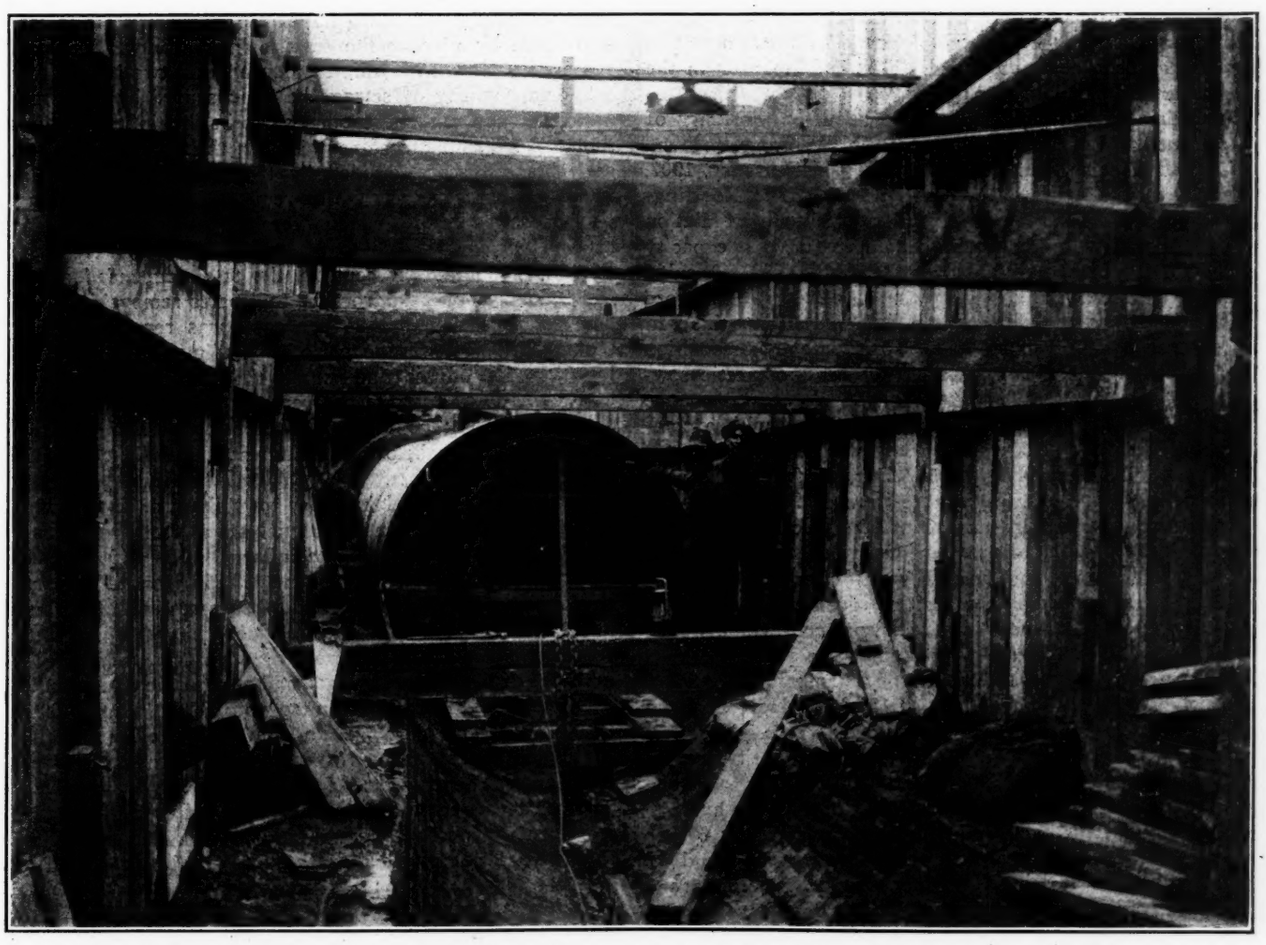
This method of excavation had been tried out by the contractor on a piece of work recently completed by him in which the trench was but 6 feet wide and 19 or 20 feet deep, this width being just sufficient to permit the use of the steam shovel dipper between 12 x 12 rangers without difficulty. In this case the soil was fairly stiff but contained a great number of boulders, both large and small, some being practically the capacity of the bucket. The experience under these conditions convinced the contractor that the use of the steam shovel was a more economical method than the several others which he tried of excavating any trench not more than 20 to 25 feet deep, where the sewer was sufficiently large to warrant a width of excavation of 6 feet, and where the soil was sufficiently stiff to stand without sheeting to a depth of about 8 feet for a day, more or less.

A little ground water is found in this trench, and this is taken care of by an 8-inch underdrain which has been carried under the entire line of the sewer from a point several hundred feet from the outlet, a connection being left between the subdrain at its lower end and the sewer, so that the former can discharge under the latter. This subdrain consists of 8-inch sewer pipe set in a trench 18 inches wide and 12 inches deep, in the center of the main trench, ½-inch broken stone being packed around and above the subdrain pipe. Openings are left in the bottom of the sewer at intervals during construction in order that it may be possible to get at this subdrain for cleaning it out, these openings being closed when there is no longer danger of dirt being washed into the subdrain from construction work at the upper end. This underdrain is kept constructed about 25 to 50 feet in advance of the concrete work.



TOP OF TRENCH, SHOWING BRACES. WOODEN FORMS FOR OUTSIDE OF ARCH PILED AT THE LEFT OF THE TRENCH.

In constructing the concrete sewer the invert is laid first, this being carried up to 60 degrees from the invert line on each side, or through the arc which is to be



INVERT COMPLETE, WITH BRICK LINING. STEEL CENTER FOR ARCH IN BACKGROUND

afterward covered with brick. In constructing this, plank templates and 2 x 4 lagging strips are used, the comparatively rough surface left by such wide lagging being unobjectionable, as it is to be covered with a brick wearing surface. The brick are then laid to a cord on this invert with the use of templates. When the mortar of this has set Blaw forms are placed for the remaining two-thirds of the circumference. The upper surface of the invert concrete already placed is thoroughly cleaned off, and the remaining section of the sewer is placed as a monolith, wooden forms being used for the outside of the arch except for a space about 5 feet wide at the crown, which is shaped by the workmen with shovels, and is immediately covered with tar paper to prevent too rapid drying, wash by rain storms, etc. The concrete is mixed by a small continuous mixer placed on the ground surface at the edge of the trench, the concrete being discharged at the desired point by means of two to four sheet iron troughs, the concrete being thin enough to flow readily through these.

This contract, like all of the sewer construction in the borough, is under the charge of L. W. Freeman, engineer in charge of sewer construction. Theodor S. Oxholm is engineer in charge of the Bureau of Construction. The designing of the sewers is in charge of Assistant Engineer V. H. Reichelt.

IMHOFF TANK RESULTS

At Three German Installations—Effect of Temperature—Removal of Suspended Solids—Putrescibility of Effluent

The results obtained by three German installations of Imhoff or Emscher tanks in Germany were described by the chemist and the engineer of the Sanitary Board of the Emscher District, Messrs. Spillner and Blunk, and this report has been abstracted by D. Halton Thompson in the *Surveyor*, of London.

The principal investigations were upon the workings of the plants at Recklinghausen, Essen N. W., and Bochum. The first of these plants began working in February, 1907, the other two in the latter part of 1908. The Recklinghausen plant, consisting of six tanks, serves a population of 30,000. The sedimentation chambers have a capacity of 72,600 gallons and the sludge chambers 22,970 cubic feet. At the beginning of operation 1,141,200 gallons were treated per day, and three and a half years later this had increased to 2,054,000 gallons. The average composition during dry weather flow was 56 per cent. domestic sewage, 21 per cent. trade waste and 23 per cent. surface water. The Essen plant contains nine tanks with a combined capacity of sedimentation chambers of 257,400 gallons, and sludge chambers of 56,510 cubic feet. The area of drying beds was 1,080 square yards. Sixty thousand population is served by this plant. At the beginning of operation 5,706,000 gallons per day were treated, which had increased one and a half years later to 12,553,200 gallons. The average composition during dry weather was 32 per cent. domestic sewage, 68 per cent. trade waste, and no surface water. At Bochum there were 18 tanks having a capacity of sedimentation chambers of 620,400 gallons, and of sludge chambers of 127,050 cubic feet. The area of the drying beds was 2,640 square yards. The population served was 145,000. The average quantity treated at the beginning was 7,988,400 gallons per day, and one and a half years later was 15,976,800 gallons. The average composition of the sewage during dry weather was 60 per cent. domestic sewage, 30 per cent. trade waste and 10 per cent. surface water. The trade waste at Recklinghausen was mostly colliery drainage, that from Essen was almost entirely from the Krupp steel works, and that at Bochum from both collieries and steel works.

The lowest temperature experienced in the country where these plants are located since they went into operation was 15 degrees F., so that they do not form an infallible indication of what might take place in the northern part of the United States. It was found, however, that the lowest temperature reached by the effluent at Recklinghausen was 44 degrees F., due to the addition of snow water after a sudden thaw. On the day of lowest temperature the temperature of the inflowing sewage was 57 degrees, and that of the effluent 56 degrees. The maximum fall of temperature was about 1.8 degrees F. during sedimentation.

In studying the operation of the plant two classes of analyses were made, one consisting of simple and rapid tests which could be made at the plant, the other of more complete chemical laboratory analyses. The freshness of the sewage was considered to be indicated by the absence of sulphuretted hydrogen, the presence of which in the sewage was determined by heating it and passing the vapor over lead paper, which would be turned brown or black by any sulphuretted hydrogen liberated in this way. It was found that in no case was there any sulphuretted hydrogen in the effluent when it was not found in the influent also. When the plant first began operation there were a number of cesspools discharging putrescent matter into the sewers, and sulphuretted hydrogen was consequently given off at the disposal plant. Moreover, it has been found that during the first few weeks of beginning operation of a new tank sulphuretted hydrogen is likely to be given off. But after a tank is ripe, none of this gas is given out unless it is present in the inflowing sewage.

Another simple test is that for the percentage of removable suspended solids which are removed; "removable" suspended solids being those which are deposited by simple sedimentation during two hours of quiescence. The test was made by placing the sewage in a graduated conical vessel, the amount of sediment deposited in two hours from a known quantity of sewage being measured by the graduations. The amount so deposited in the influent minus that deposited in the effluent is then the amount removed, and this difference divided by the deposit from the influent gives the percentage of removal. Of the total suspended solids, those which were removable in the day sewage varied from 66 to 81, while in the night sewage they were but 33 per cent. of the total suspended solids. The effluent contained from 0.2 to 4 parts removable solids. The tests showed that 95 per cent. was removed by the tanks when the average period of sedimentation was not less than 45 minutes, and usually the percentage was even higher than this in spite of great variations in the amount of influent. When, however, the period of sedimentation was permanently below 45 minutes the efficiency of the tank was reduced.

The more elaborate laboratory tests showed the following average results from monthly analyses at the three plants: Total suspended solids in the influent, 40.2, 45.0 and 46.7 parts per 100,000; in the effluent, 9.3, 12.8 and 13.5 parts. Dissolved solids, 92.1, 215.5 and 232.5 parts in the influent, and 90.5, 193.8 and 231.9 in the effluent, showing very little reduction. Ammoniacal nitrogen, 2.09, 2.39 and 3.77 in the influents of the different plants, and that in the effluents 1.81, 2.33 and 3.59. Albuminoid nitrogen, 0.81, 1.05 and 1.09 in the influents and 0.80, 0.85 and 0.90 in the effluents. The suspended solids removed averaged 70 per cent., 76.8 per cent. and 72.7 per cent. in the three plants, respectively. The sewages were weakly alkaline and nitrates and nitrites were usually absent in both influent and effluent. Night samples are not included in the analyses just referred to.

The small reduction in dissolved solids was probably due to colloidal action, and that in the albuminoid nitrogen to the decomposition which is always taking place in sewage, even when flowing in the sewer. The ammoniacal nitrogen

lost was probably given off as gas to the atmosphere. For some reason no "oxygen absorbed" tests were given, but only the qualitative sulphuretted hydrogen tests described above.

To determine what effect the effluent would have upon streams, one part of Recklinghausen effluent was mixed with one part of surface water, and one-half of the mixture placed in a closed jar and the other one-half in an open one. Also a mixture of one part effluent to two parts of surface water was placed half in a closed and half in an open jar. In the closed jar with one to one dilution, putrefactive action was considerably reduced, while in the open jar it was not observed within ten days, and the mixture was therefore considered non-putrescent. In the one to two mixture in the closed jar sulphuretted hydrogen was in no case detected within seven or eight days, and in some cases not at all. These were believed to indicate that no putrefaction would take place in the streams receiving this effluent.

In the Recklinghausen plant the amount of solid matter in the sewage varied greatly, this fluctuation being greatest in the suspended solids. The total suspended solids in the influent varied from 12 to 129 parts per 100,000 on different days, while those in the effluent varied from 4.5 to 38 parts. The amount of suspended matter removed during sedimentation varied from 18 to 90 per cent., averaging about 73 per cent. The total organic suspended matter in the effluent varied between 1.3 and 20 parts.

PRESCOTT SEWER NOTES

THE City of Prescott, Arkansas, is building a system of sanitary sewers covering practically the entire business and residence districts. While the construction calls for nothing difficult, in a few things the system, when completed, will be somewhat different from many others in nearby towns.

As the system is constructed a house connection is laid to the curb line for each lot now improved for business or residence purposes. In the case of unimproved lots, Ys are left as usual. But in place of depending entirely on reference measurements for finding these Ys in the future, each one is marked by placing vertically in the ditch, before backfilling, a board or other marker. These markers are brought up to within six or eight inches of the top of the ditch. So in the future when a Y is wanted, measurements can be made and by digging a few inches to uncover the end of the marker the plumber can be certain he is in the right place before going to the expense of uncovering the pipe. In so many cases a mistake is made in recording the location of a Y, or an error is made in the remeasurements to locate the Y, and experience has shown these markers save a great deal of trouble and expense in after years.

After considering the matter carefully the Board of Sewer Commissioners ordered the house connections laid to the curb or property line at the same time, and as part of the contract for the sewer system; and the bond issue was made sufficient to cover this work.

A few of the reasons for this order are as follows: The streets would be restored to their normal condition sooner than if the laying of house connections were allowed to drag for two or three years, as is so many times the case.

The work could be done more cheaply and better at one time than to leave the house connections until later. When paid for by the bond issue, the cost to the property owner of this part of his connection with the sewer will be hardly noticeable, and will remove somewhat the objection of expense in making connections with the sewer.

And in this way it is believed the sewer system will come into general use sooner, and with less urging or compulsion from the Board of Health than would otherwise be the case.

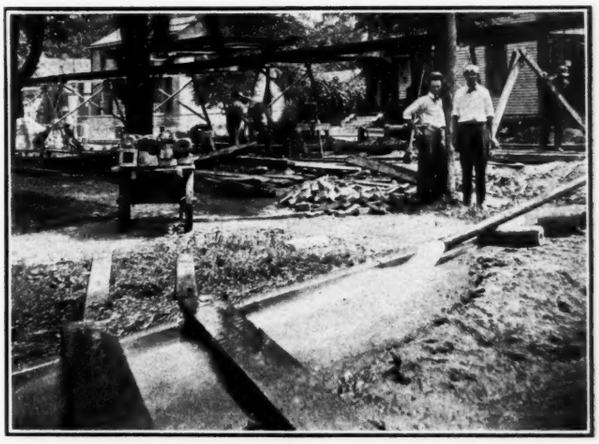
As the water plant also is owned by the city, future connections for either water or sewer will be laid to the curb line without direct charge to the property owner.

The laws of the State now provide that all connections for either water or sewerage shall be made by the person, firm, or corporation owning the plant and that service lines shall be run to the curb line without expense to the property owner. While this law only applies now to a small part of the State, it may be, and probably will be, extended in time to cover the entire State.

SEWER LAYING IN WET TRENCH

IN the construction last summer of lines of pipe sewer in Shelbyville, Ind., the contractors, The Julius Keller Construction Company of Indianapolis, found conditions unusually difficult so far as ground water was concerned, and resorted to a number of expedients to secure satisfactory work. The soil was a water-bearing gravel mixed with more or less sand. The specifications required a sewer which should be watertight on completion.

The contractors excavated the trench with the use of a carrier rail and buckets, and also used trench machines. Water was encountered very close to the surface, which required close sheeting to be started before the trench reached any considerable depth. The specifications called for the use of pozite (a mixture of sulphur and fine sand) in making the joints; but this requires that the bell and spigot of the sewer pipe be dry when the hot jointing material is poured. The contractors found it practically



PUMPING OUT SEWER TRENCH.

impossible, with steam pumps working night and day, to so reduce the water level as to enable them to use pozite and secure a joint which was satisfactory to themselves and the engineer—this in spite of the fact that they were using three 4-inch steam pumps close to the point where the sewer was being laid in their effort to hold the water below the invert, the cost of which was about $25 per day.

After struggling with this difficulty for some time the contractors decided to try some other jointing material, with the consent of the engineer and sewer committee, and made a test of the G-K Compound, of which vulcanized linseed oil is the most important ingredient. It had been stated that this material could be used even though the water was standing at some elevation above the invert of the pipe, and their experience proved this to be the case. At one time while laying 18-inch pipe the water rose to a point 4 inches above the top of the pipe without stopping the pouring of the joints. This characteristic permitted them to discontinue the use of the steam pumps, except such as might be necessary to keep the water in the trench below the tops of the pipes and to permit the excavating of the trench.

FOURING JOINT WITH G. K., AS IS DONE IN TRENCH.

On one occasion a section of 12-inch sewer 64 feet long was laid and jointed before beginning the back filling, when a heavy rain occurred which lasted for several hours and filled the trench to the surface with water. When this water had been pumped out it was found that the pipe had been raised (probably by flotation) above the grade at which it had been laid and gravel and soil had been washed under it, the center of the 64-foot stretch having been lifted 14 inches. The flexibility of joints made with this material is shown by the fact that, in spite of this distortion, the stretch of pipe was watertight; although, of course, it was necessary to relay it to the proper grade.

In laying the pipe two 2-foot lengths were placed vertically one on top of the other on the bank and the joint poured. These two lengths were then lowered into the trench and the joints there poured with the use of an ordinary pipe runner. Each joint was carefully inspected by Superintendent of Sewers Churchill, and as soon as all joints were satisfactorily run the trench was back-filled, this immediate back-filling reducing the amount of ground water to be handled and the danger of injury to the pipes, of their being forced out of line or grade by workmen walking on them, etc.

MADISON, N. J., SEWAGE PURIFICATION

Under the head of "Municipal News" in our issue of December 14 there was published the statement that the Borough Council of Chatham, N. J., had been informed that the sewage of Madison was pouring through a manhole into Day's Brook, which passes only 400 feet from the borough's water shed, whereas this sewage was supposed to be purified by a plant which was described in our issue of March 8, and which contained one of the first Emscher tanks in this country.

We have been informed by George W. Fuller that "the only by-passing of the Madison sewage was done absolutely unintentionally in connection with the completion of the construction of the siphon line, when a blow-off valve was opened to remove the water in the gate chamber. The workmen forgot to close this blow-off. In consequence sewage passing through the other siphon to the manhole at its outlet then flowed in part back from the outlet manhole to the blow-off of the duplicate siphon line." Mr. Fuller believes that the water issuing from the blow-off was for the most part ground water from the excavation above, with some back water from the 18-inch outfall sewer at its junction with the joint trunk sewer.

It appears from this that, while there was a discharge of Madison's sewage into the creek, this was not intentional, was but a small part of the sewage of the borough, and was continued for but a short time.

LOS ANGELES AQUEDUCT SIPHON

Steel Pipe Supported on Concrete Piers—Bituminous Paint as Protective Coat—Work Done by City Employes Handling Materials—Speed and Cost

By Burt A. Heinly.

In the construction of the Los Angeles aqueduct, by which the municipality of Los Angeles is to obtain a supplementary water supply of 258,000,000 gallons daily from the Sierra Nevada mountains, the problem of crossing deep gulches and canyons has been a serious one. The method adopted for the broad and deep canyons has been the use of the inverted steel siphon, of which there will be a total of tewnty-three. These range in diameter from 9 to 11 feet, and in length from a few hundred feet to the Antelope valley siphon, which is two miles long,

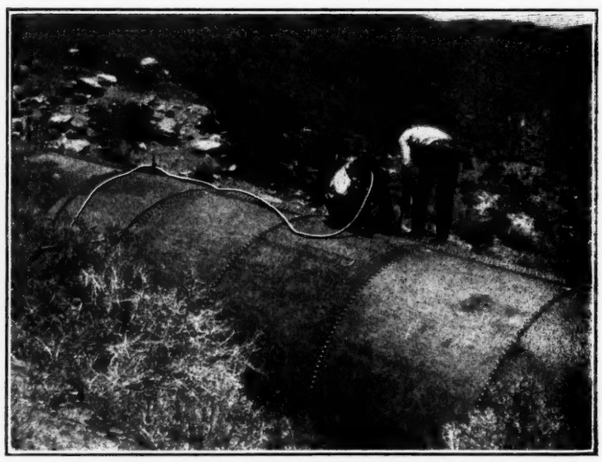
While aqueduct engineers have been at work for two years on the different problems presented, the construction has been left to the last as a work that could be pushed rapidly, with a resulting saving of interest charges on $1,400,000, the estimated cost of the 51,000 feet of steel pipes.

The construction of the Nine Mile siphon has just been completed. The details of its construction are interesting not only on account of the large size of the main but also for the reason that the methods adopted have proved highly satisfactory and will be pursued on the remaining siphon work to be undertaken immediately.

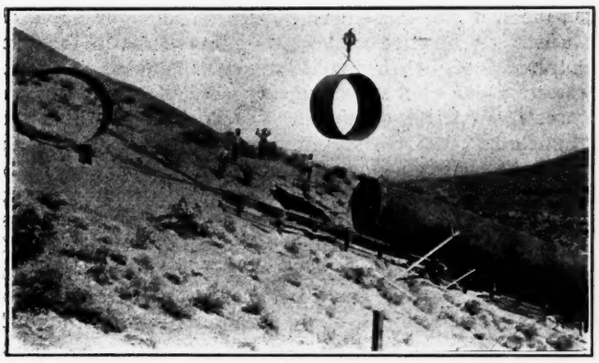
The length of the siphon is 1,409 feet and the diameter is 9 feet 6 inches. It is designed for a capacity of 430 cubic feet per second at a velocity of 6.07 feet, with a slope of hydraulic gradient of 0.00196. The greatest head on the pipe is 179.5 feet.

The thickness of the shell is five-sixteenths of an inch for 163 feet across the bottom of the canyon, and one-fourth of an inch for the remainder of the distance; these thicknesses being based on a working stress of 15,000 pounds per square inch on the cross section and without additional allowance for deterioration.

The siphon is of single plate construction, the plates having a breadth of 72 inches and a perimeter of 29.84 feet. The plates were rolled, punched and bevel-sheared at the mill which supplied them. Each plate, after having been assembled, checked and accepted by the city's inspector, was marked with a serial number designating its exact position in the completed pipe, and a working diagram showing the position of each plate and section was mailed in triplicate to the engineer in the field.



PNEUMATIC RIVETING OF SIPHON.



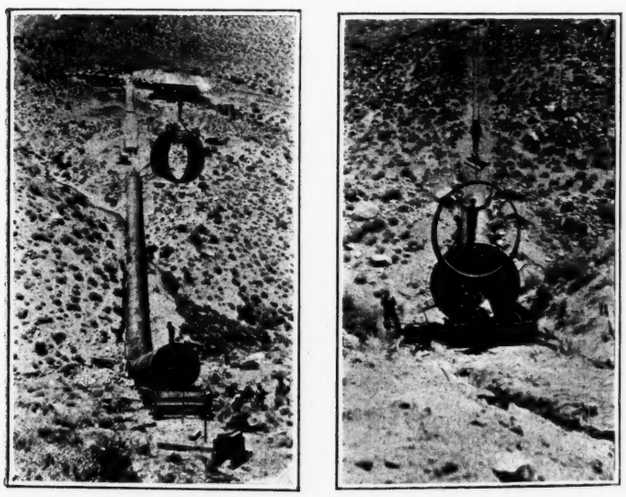
LOWERING STEEL RING FROM CABLE.

In shipping, the plates were nested on board flat cars and dispatched to their destination at Narka, Inyo, Cal., an aqueduct railroad station on the Mojave desert. From here they were carted, four sheets to the load, four miles back into the canyon, where they were hoisted into place, riveted and caulked.

The hoisting equipment consisted of a cable way, with a one and one-half inch standing cable and one-half inch conveying and hoisting ropes, which was operated by electrically driven friction hoists deriving their power from the aqueduct's hydro-electric plant on Cottonwood creek, 75 miles to the northward.

The work was all done by the city under force account and was begun at the lowest point of the siphon, which was then carried simultaneously up both walls of the canyon. The force employed consisted of 15 men, comprising a foreman, hoistman, caulker, four steel erectors and two crews each containing a riveter, heater, sticker and bucker-up.

The riveting was done with compressed air hammers supplied with air by a small motor driven compressor, and follows the requirements of the Hartford Boiler Insurance Company. At the bottom of the canyon the pipe is triple longitudinal riveted; higher up it was double riveted, with single riveted circumferential seams.



TWO END INCLINES OF SIPHON.

The average rate of speed in riveting was two lengths at each end of the siphon per day of eight hours, although this was often extended to three lengths.

The pipe was first laid on wooden blocking and was braced inside to retain its circular shape. Concrete piers sunk to good foundation were then installed. These piers are spaced 18 feet apart, have a width of two feet and are carried up the sides of the pipe to within six inches of its center line. The bottom line of the siphon is practically 2 feet above ground. After the piers were in, the braces were knocked out and the siphon was filled with water to reduce the movement of expansion and contraction due to the wide range of temperature experienced in this high desert country.

In painting, the siphon was first given a coating of a thin water gas tar, the idea being that this thin mixture would penetrate any rust and get directly at the steel. Following this, coal tar considerably heavier was applied to serve as the surface coating.

The cost, exclusive of the piers and after making allowance for the salvage of equipment and timber supports, amounted to $18.47 per lineal foot, or $5.18 per cwt.

DOUBLE MUNICIPAL WATER SUPPLIES

Naturally Pure Supply for Drinking and Cooking, Sterilized Impure Supply for Other Uses—Sanitary and Financial Considerations

ABSTRACT OF PAPER BEFORE NEW ENGLAND WATER WORKS ASSOCIATION BY PROF. W. T. SEDGWICK AND H. P. LETTON.

The larger cities of the country, with but few exceptions, obtain their water supplies from rivers, lakes or large artificial storage reservoirs. Some of these sources are grossly polluted and many others are in constant danger of becoming so, and in consequence a considerable number of the cities have been or will sooner or later be compelled to filter the water or obtain a new supply from a more distant, nonpolluted source. Moreover, neither a filtration plant nor careful oversight of the water shed is an infallible safeguard, as is shown by the typhoid fever epidemics at Lawrence, Mass., New Haven, Conn., Plymouth, Mass., etc.

We are at present in a peculiar position—namely, when most of the water supplied to our modern communities is not used either for drinking or for cooking, and yet, since any of it may at any time be used for these purposes, all of the huge streams that pour through our cities are expected to be, from the sanitary standpoint, above suspicion. Thus far we have got on fairly well under this arrangement, but the time will probably come when the amount so required will become so vast and so costly to keep up to the required purity, that we shall be driven to double supplies—one for drinking and cooking, the other for all other purposes.

Even if it be granted, however, that with proper precautions the danger to the public health from ordinary water supplies is small, the question still deserves to be considered whether from a sentimental or aesthetic standpoint the time has not come for double municipal supplies.

Even though a sewage laden river water be filtered so as to be harmless from a pathogenic standpoint, the average consumer would not care to dwell in detail upon the proximate sources while drinking it, but would prefer one which had never been polluted; or, as put by one engineer, the average man prefers innocence to repentance. In addition to this objectionable characteristic of so many water supplies, water obtained from impounding reservoirs is often colored and of a marked taste or odor, due to the growth of microscopic organisms. Again, surface supplies are often unpleasantly warm in the summertime.

The average daily consumption of water in United States cities of 100,000 population or more is about 115 gallons per capita, and of this amount Dexter Brackett has shown that not over thirty-five gallons are used for domestic purposes, and less than three gallons for actual drinking and culinary purposes. If we allow ten gallons per capita per day for the last named purpose, and consider this means only one million gallons per day for a city of 100,000 population, we see that it would be possible in practically every case to obtain a supply of ground water

sufficient for such purposes, and which would be purer and more potable than even filtered surface water.

The subject of double supplies has been broached before, and there have even been instances of its application; more in Europe than in this country. What has been believed to be the insurmountable objection has been that it would be impossible to prevent people from drinking from the impure supply. This was clearly shown at Lawrence, Mass., in 1893, when the mill operatives insisted upon drinking canal water instead of filtered city water, and nine of them died from typhoid fever in consequence. In order to make the double system practicable, it is necessary: (1) *To so regulate the use of the smaller supply that it shall not be wasted,* and (2) *to so treat the larger supply that it shall not under any circumstances be used for drinking.*

The first condition could be attained by making the cost of the water such that its value would be appreciated and by metering all services. It is the second condition, or that of denaturizing (a term applied by Mr. Letton), or sterilizing the supply, so to speak, that is the novelty brought forward in this paper. Calcium hypochlorite, which is being extensively employed as a sterilizer for water and sewage will, it is believed, be a satisfactory "denaturizer," from both a sanitary and an economic standpoint. Its especial fitness for the case under discussion lies in the fact that, if put into a water in such quantity that it is not all decomposed, it imparts to the water an odor and a taste that are very disagreeable. With a water thus treated, its use for drinking would be very rare, and even if so used no harmful results would follow, as the water would be practically sterile and as a little undecomposed hypochlorite is probably not detrimental to health. The hypochlorite would not affect the use of water for flushing water closets, in wash tubs, bath tubs, sinks, and bowls. In few, if any, cases would it be at all objectionable for use by steam railroads, factories, elevators, power plants, and office building purposes. For such purpose as street sprinkling, ornamental fountains, sewer flushing, and fires the chemical would be of benefit rather than a detriment, on account of its disinfecting action.

It would seem, therefore, that as a sanitary measure the plan is highly commendable. To determine whether it is economically practicable is a much harder problem, as this will be established largely by local conditions. It would, of course, be necessary to install a separate distribution system, and, although this would be of much smaller piping than the present one, it would still be the large item of expense. Separate house services and meters would also be required. The object of this paper was merely to present the plan as it stands to-day to water work's officials, engineers and sanitarians, in the belief that it is a new aspect of an old problem, and one that can be and will be profitably applied in some cases in the near future.

In discussing this paper two or three of the members raised the question whether the addition of the chlorine would not make the water more corrosive to pipes and fixtures. In answer to this Prof. E. B. Phelps stated that he had under his personal supervision three instances in which water is pumped, which had been previously treated with hypochlorite. Special examination had been made of the interior of the pumps from time to time, but so far there had been not the slightest sign of any injurious action. One pump had been in operation for ten months with water receiving 7½ pounds of hypochlorite per million gallons; another for eleven months with water receiving 8 pounds, and the third two years with water running as high as 12 pounds. In none of these cases, nor of the several others which he had had under his immediate observation, had there been any unusual complaints from or indications of corrosion in the pipes. A careful study of the chemical principles involved had led him to believe that the action of this extremely dilute and slightly alkaline solution is protective rather than otherwise. In the concentrated form in which the solution is handled the slight protection due to the alkalinity is more than offset by the corrosive properties of the free hypochlorous acid liberated.

Concerning the cost, Professor Phelps remarked, that one could easily conceive a situation in which it would be cheaper for a town to install the double distribution system and utilize two sources of supply than to go a long distance at considerable expense for a supply furnishing all the water required for all purposes, which would be of a satisfactorily potable quality. The cost of plumbing for a separate supply for drinking purpose only would, according to George A. Caldwell, for an ordinary twelve-room house with four outlets for drinking water only, using brass pipe, not exceed $50 including all labor and material, but not the meter nor the service from the main to the house. In many cases the cost would not exceed $25, and the average cost would probably be about $35. It seemed to John C. Chase that the only practicable method would be to supply only the pure water to the residence districts, confining the double supply to the manufacturing sections.

Both the speaker last referred to, John H. Cook, and others, referred to the danger that the non-potable supply would be used by many people for drinking purposes. In Jersey City a great many mills were supplied with two systems, labeled "Do not drink this water" and "This water for drinking purposes"; but the employees would drink indifferently from both faucets. The same thing occurred in Haverhill, Mass., and in other places.

In replying to these comments Professor Sedgwick called attention to the two novel suggestions of his paper —that the water was to be sterilized so that it would not be dangerous to drink, and that the hypochlorite would be used in such quantities as to give it an unpleasant taste, and thus discourage its use as drinking water. "It is not a question between a bad smelling and bad tasting water and a good water; it is a question between two kinds of safe water, one derived from sources naturally pure and above objection on the score of sewerage origin; the other, not standing in that catagory, but coming from objectionable sources."

POWER FROM GARBAGE IN EUROPE.

The generation of electric power from the combustion of garbage on the continent of Europe has been less successful than in England. In general the plants employed are different, the Germans, for instance, using forced draft of 300 to 600 m.m. of water, instead of 60 to 100, as in England. Grates of the bar variety are not used, but troughs into which the material is dumped and through holes in the sides of which the air is blown. Such plants have been built at Wiesbaden, Mickolez, Kiel, Brunn and Frankfort. Continuous grates, however, have been used at Paris, Ixelles, Havre and Rouen, while installations of this kind are under construction at Rotterdam. In plants at St. Petersburg, Zurich and Furth automatic devices for charging the furnaces are used. The new continental plants are designed with a view to power production, the usual guarantee being one pounud of steam per pound of refuse. Data regarding some continental plants follows:

Frankfort, six horizontal water tube boilers having 750 square meters of heating surface furnish steam to two 500 hp. engines, which generated 2,290,143 kw. h., of which the plant itself consumed 377,039, municipal lines used 984,316 kw. h., and the water works plant, 928,788 kw. h. Barmen, three vertical fire tube boilers having 420 square meters heating surface, which furnish steam to one 600 hp. engine, generating 1,400,000 kw. h., of which 300,000 was consumed at the plant, the balance by municipal electric systems. Brunn, two horizontal water tube boilers having 424 square meters heating surface, which furnish steam to two boilers of 675 hp.; 809,062 kw. h. were generated, of which 138,615 were

consumed by the plant, the balance by the municipal electric system. Frederiksberg, three horizontal water tube boilers having 615 square meters heating surface, which supplies steam to two engines of 340 hp.; 496,187 kw. h. were generated, of which 193,885 were consumed by the plant, 120,869 by the municipal hospital, 2,919 by the water system and 125,514 for private lighting. Zurich, three horizontal water tube boilers of 410 square meters heating surface, which supplied steam to one 220 hp. engine; 180,347 kw. h. were generated, of which 130,751 was consumed by the plant and 49,596 by shops. At Kiel there are three horizontal water tube boilers having 510 square meters of heating surface, which supply steam to one 80 hp. engine.

CREOSOTING PAVING BLOCKS

Report of City Engineer on A. S. P. S. Specifications—Condition of Older and Newer Pavements—Specifications Recommended—Cost

In June of last year, George A. Schilling, president of the Board of Local Improvements of Chicago, had his attention called by numerous personal letters and in other ways to the fact that streets which had been paved with creosoted wood blocks were in some cases an intollerable nuisance, because of the exuding tar; and also was informed from many sources that the specifications employed require the use of an oil for treating wood paving blocks which was monopolized by one or two firms, and that oils formerly used for creosoting and which had given good satisfaction were excluded.

These arguments against the specifications of the Association for Standarding Paving Specifications are familiar to readers of THE MUNICIPAL JOURNAL; but in view of the fact that no conclusion with reference to them has been presented and supported by argument in a manner to satisfy unprejudice engineers, it would seem to be worth while quoting from the report and conclusions of John Ericson, City Engineer of Chicago, who was asked by President Schilling to investigate the entire matter and report upon the same.

This report was submitted by Mr. Ericson on November 21, 1911. He states in this report that previous to 1907 the only requirements concerning the oil to be used were as follows:

> When the blocks are thoroughly dry the wood preserving oil shall be admitted into the chamber and subjected to a pressure which shall be maintained until 16 pounds of the oil shall have been forced into each cubic foot of timber and until the oil shall have impregnated the timber through the entire depth of the block and to the satisfaction of the Board of Local Improvements. The wood preserving oil shall be Kreodone-Creosote paving oil or any creosote paving oil which shall in the opinion of the Board of Local Improvements be equal thereto in quality for this purpose.

In 1907 the specifications were changed so as to require "a pure coal tar product, free from any adulteration. It must not contain any petroleum oil or any product obtained from petroleum, and shall contain not more than 5 per cent. of matter insoluble in hot benzol and chloroform. No oil obtained wholly or in part from water gas tar or oil tar will be accepted. The specific gravity of the oil shall not be less than 1.10 or more than 1.13 per cent. at 25 degrees C." The specifications then describe in detail a distilling test and apparatus, the result of which shall be that the amount of distillate shall not exceed the following:

Up to 150 degrees C.....	2	per cent.
Up to 210 degrees C.....	10	" "
Up to 235 degrees C.....	20	" "
Up to 315 degrees C.....	40	" "

These specifications, with a requirement that from 16 to 20 pounds of oil be injected in each cubic foot of wood, have since been in use for creosoted wooden block pavements for Chicago.

"The principal purpose of treating wood blocks used for pavements with creosote or other preservatives is to prevent decay of the blocks, and also to prevent swelling or expansion of the same by excluding moisture, and for this purpose waterproofing materials are sometimes added to the preservatives. Our knowledge of the effect of preservatives on the lasting qualities of wood is so far based on experience rather than on any exact scientific principles. As a matter of fact, the entire subject of preserved block pavements is, therefore, also still in an experimental stage. Wooden pavements treated with from five to ten pounds of distilled creosote oil per cubic foot have been in successful use in England and the continent of Europe for many years. The creosoted wood block pavements laid in Chicago under the earlier specifications with from 12 to 16 pounds of oil to the cubic foot of wood have been generally successful, have shown no signs of decay, and have given little or no trouble from other causes. The preservative specified for these blocks was kreodone-creosote oil or equal. The exact qualities of kreodone oil are not known to me, but it is stated to have been a distilled creosote oil with a small proportion of some heavy waterproofing substance dissolved therein." It is stated that the specifications of the city of Minneapolis were complied with by this oil, these specifications requiring a specific gravity of at least 1.09 per cent. at 20 degrees C., not more than 2 per cent. water, nor more than 3 per cent. of matter insoluble in absolute alcohol or benzine.

"The wood block pavements laid in Chicago under the later specifications have given a good deal more trouble from 'bleeding' or the exudation of tar from the pavement under the action of the sun, and also from buckling on account of the expansion of the blocks. I have examined a number of these pavements and found the conditions as regards bleeding very bad, and several cases of 'blowing up,' due to expansion of the blocks.

"Whether this excessive bleeding and buckling of the pavements is in all cases due to the character of oil or whether to other causes, as, for instance, the character of the wood, the manner of treatment, laying of the blocks, etc., I am not in a position to say definitely."

Mr. Ericson states that wood blocks properly treated with creosote oil will not decay for many years, and that whether any better results will be obtained with the heavier oil called for by the present Chicago specifications can definitely be determined only by years of service. He admits that the light oils volatilize sooner than the heavier oils under similar conditions, and that in this manner the wood theoretically sooner loses its preservative and admits moisture, which will cause decay, expansion, and the destruction of the pavement. He compared the actual results obtained by the use of the lighter oils required by the earlier specifications and the heavier oils of the later specifications, both in Chicago and elsewhere, and finds that these seem to indicate in a general way that pavements treated with the lighter oils bleed less, give no more trouble from expansion and, so far as known, will not fail through the decay of the blocks; and that they cost no more than pavements treated with the heavier oil. He finds that blocks treated with the heavier oil seem to show a heavy deposit in their outside fibres which would seem to seal the pores against the action of water. On the other hand, there seems to be a poorer penetration in such cases and an unequal distribution of the oil. "While there seems to be a reliance placed on the sealing of the fibres by a heavy deposit of oil or tar in the ends of the fibres, it is very probable that this heavy deposit will be driven out of the blocks by the hot rays of the sun." An examination of several blocks taken from Chicago pavements seemed to show that those treated with kreodone or distilled creosote oil were penetrated more thoroughly than those treated with the heavier oil, and that the heavy deposit of tar near the outer surfaces of the latter is lacking in the former.

Mr. Ericson endeavored to obtain information from manufacturers of wood blocks, but received replies to his inquiries from only a few of them, and such replies as he received were not altogether enlightening. He refers to the experiments being carried on by the Forest Products Laboratory of the United States Forest Service at Madison, Wis., some of the first results of which investigations were described in our issue of November 8, 1911. From these investigators he secured a specification for a genuine coal tar creosote of high quality, which specification he recommended for adoption in the specifications for paving Wabash avenue. These specifications were as follows:

SPECIFICATIONS FOR COAL-TAR CREOSOTE.

1. It must be obtained entirely from coal-gas or coke-oven tar, and must not contain any admixture of any tar oil or residue obtained from petroleum or any other source except coal-gas or coke-oven tar.

2. It must be completely liquid at 38 degrees C., and not more than three (3) per cent. of the water-free oil shall be insoluble in chloroform or benzol.

3. The specific gravity of the oil at 38 degrees C. must be at least 1.03 and should not exceed 1.08.

4. It shall be subject to a distillation test as follows:

The apparatus for distilling the oil must consist of an ordinary 200 cm. distilling flask having side neck not over 2 inches above the body of the flask.

The bulb of the standardized thermometer shall be one-half inch above the surface of the liquid in the flask and during the progress of the distillation it shall remain in the position as originally placed. The distance between the thermometer bulb and the end of the condensing tube shall be 22 inches. The bulb of the flask shall rest on an asbestos board at least 6 inches square, through which a round hole has been cut 2 inches in diameter. This hole is to be further enlarged by cutting 6 notches around its circumference, these notches to be one-half inch deep. The bulb of the flask shall also be protected so as to prevent excessive heat radiation by placing around it an asbestos cylinder 4 inches in diameter and 3 inches high; and resting on this shall be a piece of flexible asbestos board of sufficient size to fully cover the cylinder; said cover having a slit cut from the outside edge to a round hole 1½ inches in diameter cut in the center to admit the neck of the flask.

The distillation shall be continuous and at the rate of 1 to 2 drops per second.

One hundred grams of the oil shall be taken and all percentages determined by weight on the basis of dry oil.

Tested in the above manner it shall give no distillate up to 200 degrees C.; less than five (5) per cent. up to 210 degrees C.; less than twenty-five (25) per cent. up to 235 degrees C.; less than thirty-five (35) per cent. residue at 355 degrees C.

5. The distillate between 210 degrees and 235 degrees shall, on cooling to room temperature (77 degrees F.), yield solids.

6. The oil shall not contain more than three (3) per cent. of water.

The engineering chemist of the Division of Inspection and Tests of the Bureau of Engineering of Chicago, L. S. Marsh, who was consulted by Mr. Ericson, stated among other things: "The value of the creosote oil for the treatment of timber in any form depends upon the fact that certain of the compounds or constituents of the oil have a toxic effect on fungi and wood destroying insects, and the fact that the compounds of the aromatic series have a greater toxic effect than those of the paraffine series, indicates the method employed in the manufacture of the tar from which the creosote oil is distilled, and will determine to a great extent the value of the resulting product as a wood preservative. In the valuation of a creosote oil to be used as a wood preservative, it is not only necessary to specify that the same shall be the product of the distillation of coal tar, but also to specify the fractionating limits and the specific gravity of the oil This is necessary in order to insure that the oil shall contain a large proportion of the aromatic compounds." Mr. Marsh stated that whether creosote from water gas tar is as efficacious as that from coal tar, and whether the calking of the pores of the wood with heavy tar oils acts as a waterproofing agent, are matters which have not yet been definitely determined. "One thing, however, is certain, and that is, if wood blocks are properly treated with a genuine coal tar creosote oil of 1.01 to 1.09 per cent. specific gravity, the timber will be effectively protected against decay and will, if the creosoting has properly penetrated the fibre, resist to a great extent the penetration of water. Blocks thus treated will show little or no bleeding from the effect of heat, nor will they buckle if proper expansion joints are provided."

As to whether the new specifications favor a monopoly in oil, Mr. Ericson does not seem to have fully decided. His investigations appeared to show that the production of both true creosote oil and the heavier "paving oil" were industries of limited extent. That a great deal of creosote is imported from Germany, where the entire output is controlled by a syndicate. That two principle factors in the development of the industry of manufacturing creosotes are the high initial cost of by-product plants and tar distillation works, and the lack of a market for some of the other products of the distillation. The value of the creosote alone will not justify the distillation of tar. Mr. F. J. Lewis, of Chicago, a manufacturer of tar and tar products, states that the price of distilled creosote oil and of paving oil would be about the same. The Barrett Manufacturing Company stated that the price of the special coal tar heavy oil is 7 cents per gallon f. o. b. factory; while that of the creosote oil required to meet the specifications of the American Railway Engineering and Maintenance of Way Association is 7½ cents a gallon f. o. b. factory. Mr. Ericson assumes that 20 pounds of the heavy oil would be required per cubic foot of timber, and that 15 pounds of the lighter oil would be equally efficacious; and calculates that using these quantities the cost of the heavier oil per cubic foot of timber would be 15.54 cents, while that of the lighter oil would be 12.53 cents.

From his investigations he concludes:

"That wood block pavements laid under the older Chicago specifications are preferable to those in which the heavier oil of the later specifications was used, at least for Chicago streets.

"That the 'bleeding' is caused principally by the use and excessive quantity of this heavy tar oil in the preservation of the blocks which is in some cases aggravated by improper provision for expansion.

"That this 'bleeding' can be largely avoided by the use of the lighter creosote oil as a preservative, and by the proper selection and manner of placing the filler between the blocks.

"That absorption of water and the consequent heaving of the paving can be largely avoided by laying the blocks in the pavement as soon as they are delivered on the work and by the provision of proper expansion joints.

"That no definite rule as regards the character of oil, manner of treatment, etc., can be adopted for all conditions of streets and traffic, but that different conditions require different treatment.

"That if the lighter oils for preserving wood blocks for pavements are eventually found to be preferable to the heavier oils for all conditions, there can and will undoubtedly be an inducement to cause sufficient oil to be manufactured for this purpose at a reasonable price.

"That fifteen pounds of oil per cubic foot of wood is generally sufficient to effectively preserve the wood for the length of time of its mechanical life and prevent absorption of water and that it may be found that much less than fifteen pounds will do. This will vary with traffic conditions.

"That the manufacture of both creosote and the heavy or 'special paving oil' seems to be limited to comparatively few concerns, which may or may not have formed combinations.

"That the lighter creosote oil is also manufactured in and imported from Europe and can be obtained at reasonable price."

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JANUARY, 4, 1912.

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Changing City Engineers

A CONSIDERABLE and, we believe, an increasing number of cities install their new officials on January 1; and in those cities where the office of city engineer is an appointive one the occupant of that office, if he has not already been notified that his services will soon be dispensed with, is likely to be on tender hooks for several days or weeks to come, until the appointments of the new administration had been made public. There are a great many cities, we are glad to say, where no change in the city engineer has been made for many years; although how often there has been a change of party meantime in the government in these cities we are unable to say.

There are, of course, cases where the city engineer is not competent to hold his position; some, possibly, in which the city has outgrown his abilities, although these had been ample for a village. In these cases a change is, of course, justifiable, and no questions of personal consideration for the engineer as an individual should cause the incoming administration to retain him at the expense of the community at large. But unless such is the case, the community cannot but be the loser by a change in city engineers.

There have been instances in this country in which a city engineer, feeling himself agrieved at removal, has taken with him from the office the note books in which were recorded most of the records of his work for the city during previous years. This would be an almost irreparable loss to the city, and we believe the courts have usually held that public policy cannot permit that such a right be given the city engineer. Probably almost every citizen can realize to some degree what immediate confusion and permanent loss the absence of these notes would mean. And yet, when a city engineer leaves the department, though he may not take with him the note books, there are numerous mental notes and items of information, both general and detailed, which have never been recorded on paper, many of which it would be almost impossible to so record, which he cannot leave behind him, however good his intentions. He has an experience in the work, a knowledge of the city, a realization of its needs and a mass of knowledge concerning the conditions, physical, social and political, which affect the work of the engineering department, none of which he can hand to his successor; and yet the latter must acquire all these before he is as well fitted to serve the city as was the former incumbent. The latter acquired this information while in the service of the city, and it is therefore something for which the city has paid. If he is dismissed the city loses the use of this and the services of his successor must, during the first year or even several years of his occupancy of th eoffice, be of much less value to the community than those of his predecessor, although he is probably receiving the same salary; always assuming that the successor has not an engineering ability sufficiently greater than that of his predecessor to counterbalance the lack of that locally acquired knowledge to which we refer.

The city engineers of the United States plan and superintend the expenditure of nearly, if not quite, two hundred million dollars a year for their respective cities. Changes in the office made for political reasons would, we believe, in the majority of cases mean a difference of fully ten per cent in the economy and efficiency with which this money was spent; and twenty million is a large sum for our cities to pay to give their politicians the privilege of ousting satisfactory engineers in order that their friends and political adherents may be provided with positions.

Stone Block Pavement Foundations

To the Editor MUNICIPAL JOURNAL AND ENGINEER:
239 West 39th St., New York.

Dear Sir—Referring to editorial in your issue of Oct. 25, 1911, p. 529, which opens with the statement, "One of the most popular diversions in New York these days is decrying asphalt pavements laid on stone block foundations," the undersigned begs leave through the MUNICIPAL JOURNAL AND ENGINEER to enter a few words in favor of the system—not as generally practised in New York—of surfacing old pavements by utilizing them as a foundation for the new. In his connection with the Warren Scharf Asphalt Paving Co., he had considerable to do with this construction during the year 1885 to 1900, inclusive, and always then advocated, as he now advocates, the system, and protested against its abuse in New York. Nothing could better serve as a foundation for a bituminous surface—whether asphalt or bitulithic—than an old stone block, cobble, brick or macadam street which has been traveled over for years and thus most *solidly* compacted, *provided* that the old pavement is not disturbed before application of the bituminous surface. Among the earliest as well as the most successful asphalt pavements in New York City (now Manhattan Borough) were Park avenue from 35th street to 41st street, laid over old granite blocks, and "the boulevard" from 59th to, or about, 90th street, laid over the old macadam. Those and other of the earlier streets treated in this way were laid *without disturbing the old pavement.* Subsequently the system against which the writer and others protested at the time, was generally adopted of reducing the crown by taking up the old paving

blocks, excavating a little earth from the roadway and then repaving and, all too frequently, the repaving was done by laying the blocks on their "flat" or broad sides. Naturally, the blocks thus newly laid on recently disturbed subsoil were not solidly compacted and, as to both subsoil and newly relaid paving blocks, did not provide a solid foundation for the asphalt surface, which was frequently if not generally laid on the following and sometimes on the same day.

Of course, in such construction the irregularities of the old surface should be levelled up and the entire surface covered with a well compressed "binder course" before application of the new bituminous wearing surface; and in all cases where it is necessary to raise the blocks for reaching underground service pipes, etc., the comparatively small area thus disturbed should be supplied with a *good depth of concrete foundation.* No attempt should be made to relay the thus disturbed old paving blocks or macadam. In many, if not most cases, it was quite practicable where necessary to reduce the crown by the application of two or three inches of additional "binder" at the gutters; but where this was impracticable, it was necessary to reduce the crown or, on streets having railroad tracks, which tracks could not be raised, the old pavement should have been abandoned. Where an old block or cobble stone or brick pavement is once disturbed in preparation for a new bituminous surface, it is best to crush the old stone on the street for new concrete foundation if it cannot be more economically used for paving other streets or gutters.

During the past ten years, largely through the writer's recommendation, old macadam, block and cobble pavements have been successfully resurfaced with bitulithic and are giving excellent satisfaction.

In conclusion, as indicated in your editorial above referred to, it is not proper to charge all the troubles in New York to the use of old granite block foundations, but such of the troubles as are fairly chargeable to such foundations, it is fair to say, are due to the misuse (relaying) of the blocks and not to an entirely proper system of *surfacing-over* old pavements. Surely an undisturbed macadam, granite block, cobble or brick pavement affords a solid and very superior, economical foundation for bituminous surfaces.

Let us in this as in other failures condemn the misuse and avoid improper condemnation of proper construction.

Yours truly,

Geo. C. Warren.

DISPLAY LIGHTING IN TWO CITIES

Gas Arcs in Manchester, N. H., and Inverted Luminous Arcs in New Haven, Conn.—Lamps and Standards

Among the latest cities to adopt brilliant illumination of the business district by the private enterprise of its merchants are Manchester, N. H., and New Haven, Conn.

In Manchester, Hanover and Elm streets are two of the principal business streets, and the Hanover street merchants, after considerable discussion and agitation by a few of them, decided upon a brilliant illumination of that street, or a "White Way" as it is popularly known. Gas lamps are placed 35 feet apart, those at the end of each block being placed 15 feet from the property line. Where the "back street" paralleling Elm crosses Hanover the lamps are placed 15 feet from the property lines on diagonally opposite corners. In the block between Elm and Chestnut streets there are 16 lamps on each side of the street.

These lamps are connected with the regular service pipes already laid to the various buildings, some of the pipes serving four lamps and others but one, depending upon the load already upon them. Two newspapers are located on this street and as a constant supply was needed in both of these their service pipes were not used for the lamps, nor was one which fed a large gas engine. This procedure was desirable in order to avoid as much as possible the tearing up of the sidewalk and of the roadway pavement. A T was inserted in each old connection just inside the curb and 1¼ and 1½-inch pipes (depending upon the number of lamps each fed) were laid from these parallel to the curb, valves being placed at the junction as soon as the T had been inserted, so as to interfere as short a time as possible with the use of the services by the private consumers.

MANCHESTER'S NEW "WHITE WAY."

The posts are of iron, the lower portion being octagonal in section and 12 inches through at the widest part. The vertical gas pipe extending up the inside of the post is 2 inches in diameter for the lower four feet, above which it was reduced to one inch; the reason for this being that the ground level is considered the most vulnerable point as to freezing. At a point 15 feet above the ground an arm extends over the sidewalk provided with an ornamental brace; and a ladder bracket for the trimmer is also furnished. From the arm hangs a Humphrey inverted gas arc with five mantles and having a rated candle power of 550. The post is set upon a concrete block 14 x 14 x 6 inches, without bolting or other anchoring devices. Several posts were set with a bed of concrete, but owing to the low temperature then prevailing and the fact that it was desired to have the posts erected and in use as quickly as possible this plan was abandoned and the posts were simply set upon a concrete block and tamped in tightly with earth.

The lamps are paid for on a pro rata plan, according to the extent of the store frontage, merchants upstairs as well as on the ground floor contributing. At the present time the lamps are lighted and extinguished by a man with a pole and lighter, but the gas company is considering the installation of an appliance which will do this work automatically.

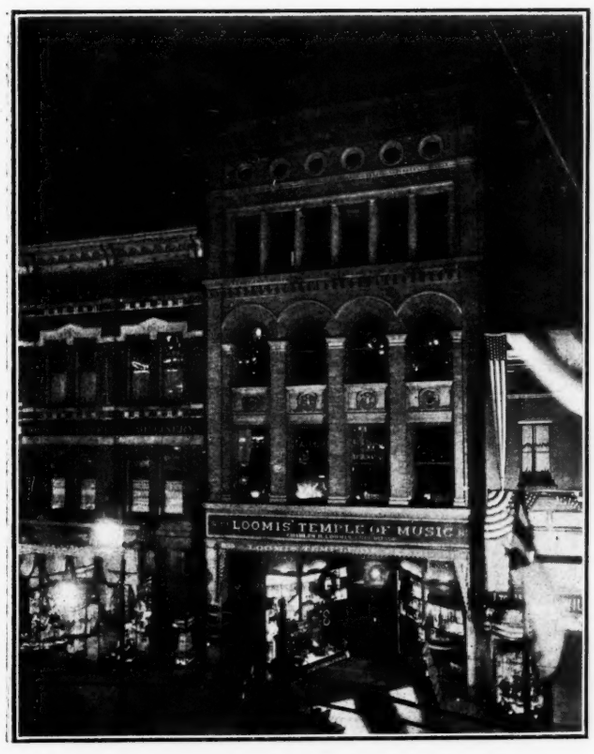
New Haven is believed to be the first city in the world to adopt for regular use a new lamp known as the boulevard type of inverted luminous arc, which has recently been developed by the General Electric Company. These lamps have been placed upon Church and Chapel streets and were first turned on December 15, the event being attended with appropriate ceremonies and witnessed not only by the citizens of New Haven, but also by prominent lighting experts and visiting delegations from several large cities. The city was decorated in a manner which was very attractive, but which interfered somewhat with a fair demonstration of what the lamps could do, since the banners and other decorative features interfered with the illumination.

The matter of brilliantly illuminating the business portions of Church and Chapel streets was first suggested last August by the United Illuminating Company of that city, and by the first of September about one-half of the merchants had signed the necessary contracts. At first it was proposed to use clusters of five 100-watt Mazda lamps, spaced about 80 feet apart on both sides of the street; but in September an inspection of eight or ten boulevard luminous arc lamps in the Lynn works of the General Electric Company, where they were being tried out, led to a change of plans and the adoption of the latter lamp. The advantages which this lamp appeared to pos-

NEW HAVEN STREET, SHOWING NEW LIGHTING STANDARDS.

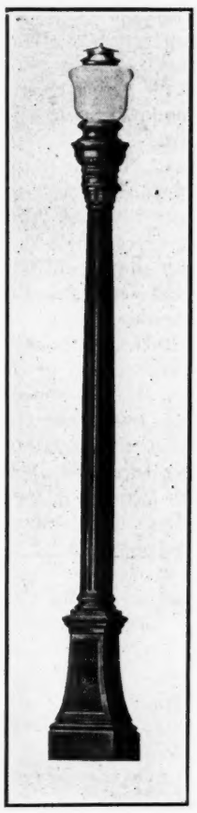
sess were that the light was of a pure white color and of such perfect diffusion as to leave no shadow around the base of the pole, and yet throw its rays upward so as to light the tops of nine-story buildings perfectly. It did not seem advisable to ask the city to install these new lights, thus favoring the merchants of a certain section of the city only, but the cost of the installation and also of the current and maintenance is borne by the merchants and property owners, divided pro rata at so much per front foot.

The district covered by the ornamental lamps extends approximately 4,000 feet on Chapel street and 1,500 on Church street. The lamps are spaced an average of 87 feet between centers and staggered on opposite sides of the street, so that the average distance, considering both sides of the street, is 43½ feet between lamps. The lamps on corners of intersecting streets are placed diagonally opposite each other and are located just outside of the building line, so that no shadow from corner buildings will be cast up the side streets. So far 75 of these lamps have been installed. They are operated from a General Electric 6.6 amperes mercury arc rectifier of 75 light capacity. Current is taken from the Grand Avenue station, which is located about 1½ miles from the nearest lamp. The lamps are connected in series and the entire circuit is underground, each lamp being connected on the loop system from the nearest manhole, this being the most economical methods, as all the streets which the current passes through are permanently paved, and this arrangement required a minimum amount of excavating. Okonite cable, with 30 per cent. fine Para compound insulation 7-32 of an inch thick and 3-32-inch lead sheath, was used for the entire installation, 27,000 feet being required.



HOW THE INVERTED LUMINOUS ARC LIGHTS STORE FRONTS.

The poles are of iron made from a special design, and were cast at the New Haven foundry of the Ornamental Lighting Pole Company of New York. Each pole is permanently grounded to the lead sheath of the cable, and in the base of each pole is an absolute cutout, so that the lamps may be cut out for the purpose of trimming or adjusting at any time without interfering with the rest of the circuit.



NEW HAVEN STANDARD.

The lamps are inverted series luminous arcs. In operation and design the mechanism is essentially the same as that of the standard mechanism of the direct current series luminous arc lamp, of which more than 75,000 are now in operation. The arc is struck between a stationary non-consumable copper upper electrode and a movable magnetite lower electrode burning under normal updraft conditions. A single side rod supports and carries the electrode, fume dome and chimney. The lamp casing constitutes the capital of the supporting post or standard, and is so designed that by releasing a latch it may be lowered to give free access to the lamp mechanism as readily as the similar operation is performed on an ordinary arc lamp.

The lamp is equipped with a diffusing opal globe that is unique in design in that it is perfectly filled with light and no circular shadows are cast upon it by the electrodes. As the globes used furnish a secondary source of pearl white light of high efficiency and low intrinsic brilliancy, it is possible to place the lamps at the low height of 14½ feet without producing a glare.

GLASS PAVING BLOCKS

Some months ago we published a brief notice stating that glass was being tried as a paving material in France. Recently information has been received that, after many experiments by the manufacturer and a test of the pavement on one of the chief thoroughfares of Lyon (at the expense of the manufacturer) the idea has apparently been abandoned. The test was made on a street where the traffic of cabs, automobiles and wagons of all kinds was very heavy. Two years after being laid the glass bricks were in very poor condition, the edges were all broken, and in many cases the blocks were split through and through, and the experiment was generally considered a failure. The material could, however, probably be used under favorable circumstances for sidewalks, or light automobile traffic. At present stone and wood are the only paving materials used in Lyon.

MUNICIPAL WORK IN 1911 AND 1912

Estimate of Work Done and to be Done, and of Apparatus Purchased and to be Purchased, Based on Special Reports from Official Sources

A TABLE in this issue gives the approximate figures for work of various kinds done by about 350 municipalities in the United States during the year 1911, and another table gives forecasts of what the same cities are expecting to do in 1912. These figures were in every case obtained during the past month directly from the city engineers or other officials. Reports were received from quite a number not given in this list which stated that no work of any consequence had been done during the year or was contemplated for 1912. These were, of course, comparatively small cities. Still other tables give the amounts spent in purchasing apparatus used in street construction, street cleaning and other municipal work, and the amounts which will probably be spent for these purposes in 1912.

In some cases the figures given are exact, but in more they are merely approximate, since in perhaps the majority of cities the department records for the year have not been made up. In fact, quite a number of the cities which did not furnish figures gave as their reason that they could not do so until the end of the calendar or fiscal year, and did not wish to or could not approximate the amount.

There are something over 1,000 municipalities, large and small, in the country which are of sufficient size and properly organized to carry on municipal work of any consequence. Of these the Census Bureau of 1907 reported concerning 158, or all of those which were estimated to have a population of 30,000 or over. This leaves say 900 municipalities of less than 30,000, of which something over 300 are represented in our table. We believe that a number of those from which we could obtain no report failed to answer because little or no work had been done by them during the year; and that it will not be far out of the way to assume that the figures obtained for these smaller cities represent about one-half the work done by such cities during the year.

Of the 158 cities larger than 30,000, only 37 are included in the calculation based on Table 1, reports from others having been received too late for this and some too late to be included in this table. The high percentage of the larger cities not reporting is due chiefly to the fact that in most of these cities there is probably no one man who is able to estimate with any approximation the amount of work done by the departments during the year; and the figures for the year are not yet available and probably will not be for several months. If we refer to the Census Report for 1907 and compare the figures for our 37 cities for 1911 with the corresponding figures for the same cities for 1907, we find that in these cities 80 per cent. more was spent for streets in 1911 than in 1907, and 127 per cent. more for sewers. If we assume that a similar increase in expenditures took place in all of these 158 larger cities, this would indicate that the amount spent by them all for street work during 1911 was $45,828,000, and for sewers $86,815,000.

The smaller cities given in the table reported spending $18,233,000 for street work and $6,200,000 for sewers. If, as explained above, we assume that the totals spent in all the smaller cities were double these amounts, we have for the expenditures by these smaller cities about $36,000,000 for streets and $12,000,000 for sewers. Adding these to the estimates for the larger cities, we have total expenditures for the year 1911 of about $81,000,000 for streets and $99,000,000 for sewers.

The tables include work done in connection with waterworks systems also, but these figures are very incomplete, chiefly for the reason that the water supplies in a large percentage of the cities are in the hands of private companies. Although the advantages of publicity by public service corporations is becoming generally recognized, there are still a great many water companies which do not desire to make public their financial statements, and we know of no figures collected by the Census Bureau or any other agency which gives a complete record of all the water work plants in the country.

Taking up the figures actually reported, we find the following totals of the several items in Table 1: Under the head of street construction there was spent in grading $4,445,555; in pavements, $16,867,025; for sidewalks and curbs, $3,855,851; and for other street construction, $1,801,323; a total for street work of $26,969,754.

The records for water works construction (incomplete for the reasons given above) were as follows: Mains, $3,486,668; meters, $242,055; pumping plants, $1,170,222; reservoirs, $1,436,189; other construction, $544,225; a total for water works construction of $6,879,359.

For sewerage the expenditures were as follows: Sewer systems, both sanitary, storm and combined, $11,100,451; sewage pumping plants, $1,908,507; sewage treatment plants, $682,909; a total for sewerage construction of $13,691,867.

For other construction work, such as bridges, viaducts, etc., $967,071. This gives a total of $48,508,051.

In a few cases the sub-divisions of the figures as given in these tables are not perfectly accurate, the figures reported and given combining two or more classes. Thus in some cases the figures given for sewerage system included small pumping plants or purification plants; the cost of paving given in several cases included grading and curbs and gutters. Wherever they were known, these groupings of several items in a single cost are indicated by footnotes to the tables.

Figures for work anticipated for 1912 were given by fewer cities than expenditures during 1911, for the reason that in many cases the officials would not venture to even guess at what a new set of officials would decide to do next year. It is probable therefore that the totals in this table should be increased by larger percentages than those in Table No. 1. In spite of this, the total of work anticipated for 1912 is about $57,000,000, or 15 per cent. more than the work reported for the year 1911. The totals of the figures of anticipated work are as follows: For streets: grading, $4,243,290; pavements, $20,706,197; sidewalks and curbs, $3,615,113; other construction, $2,018,800; a total for all street work of $30,583,400. Under the head of waterworks: Mains, $2,908,438; meters, $212,010; pumping plants, $690,100; reservoirs, $1,523,518; other construction, $3,300,800; a total for water works construction of $8,634,866. For sewerage work: Sewer systems, $16,209,863; sewage pumping plants, $149,000; sewage treatment plants, $722,800; a total for sewerage work of $17,081,665, or about 25 per cent. increase over the expenditures of last year. The total of $694,421 for general work brings the total anticipated expenditures for these purposes up to $56,994,350.

Table 2 gives the amount spent during the year in the purchase of apparatus used for street construction, street cleaning and other purposes. The total used for purchasing rollers, graders, scrapers, plows and other apparatus for street construction work totaled $115,223, while $26,313 was spent for other appliances used in street construction work. For carts, flushers, sprinkling carts, brooms and other appliances for street cleaning and sprinkling there was spent $47,170. Other apparatus purchased which

(*Continued on page* 19.)

TABLE No. 1

CONSTRUCTION WORK IN 352 CITIES DURING 1911

Name of city.	Streets. Grading.	Streets. Pavements.	Streets. Sidewalks and curbs.	Streets. Other construction.	Water works. Mains, etc.	Water works. Meters.	Water works. Pumping plant.	Water works. Reservoirs.	Water works. Other construction.	Sewerage. Sewer system.	Sewerage. Plants. Pumping.	Sewerage. Plants. Treatment.	Other construction work.
Alabama:													
Bessemer	$2,500	.....	.....	.....	.....	Private plant.			.....	$2,859	.....	.....	.....
Florence	.....	$6,000	$3,000	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....
Gadsden	5,000	15,000	22,000	.....	$50,000	$1,000	.....	.....	.....	.....[5]	.....	.....	.....
Montgomery	.....	.....	.....	$265,000[1]	.....	.....	.....	.....	50,000[1]	25,000	.....	.....	50,000[4]
Troy	.....	.....	22,000	.....	.....[3]	.....	.....	.....	.....	6,000	.....	.....	.....
Arizona:													
Phoenix	.....	100,000	10,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas:													
Helena	.....	.....	.....	.....	.....	Private plant.			.....	1,000	.....	.....	.....
Little Rock	50,000	500,000	25,000	.....	.....	Private plant.			.....	25,000	$8,000	.....	.....
Pine Bluff	9,500	.....	14,254	.....	3,945	3,660	.....	.....	.....	28,560	.....	.....	134,000[4]
California:													
Benicia	5,000	65,000	7,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fresno	80,467[22]	60,337	37,208	.....	.....	Private plant.			.....	56,837	.....	.....	.....
Los Angeles	.....	.....	.....	1,075,750[1]	.....	.....	.....	.....	.....	168,829	.....	.....	.....
Modesto	.....	40,000	3,000	.....	.....	.....	.....	.....	.....	50,000	.....	$6,000	.....
Riverside	.....	106,765	89,000	.....	.....	.....	.....	.....	.....	10,893	.....	.....	.....
San Bernardino	5,000	42,084	12,592	6,500	.....	.....	.....	.....	.....	10,560	.....	.....	.....
Santa Monica	120,000[1]	.....	.....	.....	.....	Private plant.			.....	8,000	.....	.....	.....
Vallejo	.....	40,000	10,000	.....	35,000	.....	.....	$35,000	.....	6,000	.....	.....	.....
Visalia	400	33,000	4,000	.....	3,000	.....	3,000	.....	.....	.....	.....	.....	.....
Colorado:													
Colorado Springs	40,000	.....	15,000	.....	130,000	.....	.....	25,000	.....	35,000	.....	.....	.....
Florence	10,000	.....	45,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,000
Fort Collins	4,000	.....	2,000	.....	1,000	.....	.....	.....	.....	90,000	.....	.....	.....
Leadville	.....[4]	.....	.....	.....	.....[5]	.....	.....	.....	.....	.....	.....	.....	.....
Longmont	2,000	.....	500	.....	.....	.....	.....	.....	.....	200	.....	.....	6,500[6]
Connecticut:													
Ansonia	1,500	.....	3,000	.....	.....	.....	.....	.....	.....	42,000	.....	.....	.....
Derby	2,300	1,000	1,000	.....	.....	.....	.....	.....	.....	500	.....	.....	.....
Greenwich	.....[8]	.....	.....	.....	.....	Private plant.			.....	.....[8]	.....	.....	.....
Norwich	1,000	9,000	5,000	.....	.....	.....	35,000	300,000	.....	.....	.....	.....	.....
Putnam	.....	4,000	1,500	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Southington	600	1,500	.....	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Stamford	7,500	13,600	7,500	.....	.....	Private plant.			.....	85,000	3,500	.....	.....
Florida:													
Palatka	.....	45,000	18,000	.....	.....	.....	.....	.....	.....	2,500	.....	.....	.....
Sarasota	.....	2,600	21,000	.....	.....[7]	.....	.....	.....	.....	.....[7]	.....	.....	.....
Georgia:													
Albany	27,500	.....	10,000	.....	1,000	.....	.....	.....	.....	15,000	.....	.....	.....
Americus	3,800	120,000	9,500	.....	10,000	600	7,000	5,200	2,000	40,000	.....	.....	.....
Columbus	6,320	126,000	8,673	.....	.....	Private plant.			.....	5,980	.....	.....	.....
Gainesville	.....	.....	10,000	.....	70,000	700	20,000	5,000	.....	.....[5]	.....	.....	.....
Macon	.....	100,000	10,000	.....	16,000[8]	.....	.....	.....	.....	57,000	.....	.....	.....
Rome	.....	.....	.....	100,000[1]	10,000	.....	.....	.....	.....	10,000	.....	.....	.....
Waycross	5,000	.....	6,000	.....	2,000	100	7,000	.....	.....	5,000	.....	.....	.....
Idaho:													
Boise	.....	424,312	18,978	.....	.....	.....	.....	.....	.....	74,251	.....	.....	460,564[9]
Lewiston	30,000	.....	45,000	.....	10,000	1,000	7,000	.....	.....	.....[5]	.....	.....	.....
Pocatello	3,000	.....	20,000	.....	.....	.....	.....	.....	.....	64,000	.....	.....	.....
Illinois:													
Alton	800	80,000	22,100	.....	.....	Private plant.			.....	.....[5]	.....	.....	.....
Aurora	.....	85,000	.....	.....	.....	.....	.....	.....	.....	75,000	.....	.....	.....
Bloomington	8,000	87,915	10,200	.....	15,867	.....	.....	.....	.....	5,384	.....	.....	.....
Canton	2,000	30,000	.....	.....	7,000	1,200	11,000	.....	.....	3,000	.....	.....	.....
Carlinville	500	.....	3,000	.....	500	.....	.....	.....	.....	1,500	.....	.....	.....
East St. Louis	20,000	161,000	54,000	.....	.....	.....	.....	.....	.....	436,000	121,000	.....	.....
Galena	.....[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....[5]	.....	.....	.....
Galva	.....	.....	2,000	.....	.....	1,300	.....	.....	.....	25,000	.....	.....	.....
Greenville	150	4,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harvey	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,000	.....	.....	.....
Jerseyville	1,800	.....	1,200	.....	4,300	.....	.....	.....	.....	500	.....	.....	.....
Joliet	5,000	48,000	15,000	.....	18,000	5,000	12,000	.....	20,000	6,000	.....	.....	.....
Lake Forest	.....	35,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lincoln	.....	25,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marengo	1,000	.....	4,000	.....	.....	1,500	.....	.....	.....	8,000	.....	.....	.....
Marion	.....	21,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Normal	.....	2,400	9,000	.....	1,500	.....	.....	.....	.....	1,400	.....	.....	.....
Mattoon	.....	27,000	4,750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moline	.....	112,145	23,033	.....	11,172	.....	.....	.....	.....	14,841	.....	.....	.....
Oak Park	5,200	78,000	63,000	.....	25,000	4,000	12,000	.....	.....	20,000	.....	.....	.....
Pekin	.....	60,000	.....	.....	.....	.....	.....	.....	.....	100,000	.....	.....	.....
Rockford	.....	192,600	.....	.....	60,000	.....	.....	.....	.....	38,868	.....	.....	12,823
Rock Island	.....[3]	.....	.....	.....	16,000	.....	.....	.....	60,000[11]	63,000	.....	.....	.....
St. Charles	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....	.....	.....	.....
Streator	1,000	12,000	5,000	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....
Taylorville	3,000	60,000	400	.....	500	.....	.....	.....	.....	280	.....	.....	.....
Urbana	.....	35,000	10,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waukegan	.....	25,000	.....	.....	1,000	.....	.....	.....	.....	28,500	.....	.....	.....
Indiana:													
Auburn	.....	2,432	1,000	.....	.....	.....	.....	.....	.....	22,960	.....	.....	22,000[13]
Bedford	1,100	13,700	3,890	.....	3,800	98	3,500	.....	.....	.....	.....	.....	.....
Bloomington	3,000	22,000	24,000	.....	9,000	.....	.....	800	.....	9,500	.....	.....	.....
Boonville	.....[5]	.....	.....	.....	3,500	500	.....	19,000	.....	.....[5]	.....	.....	.....
Brazil	300	.....	.....	.....	4,500	800	3,000	.....	.....	4,000	.....	.....	.....
Crawfordsville	1,500	.....	10,000	.....	4,000	3,000	.....	.....	.....	1,700	.....	.....	.....
Evansville	.....	77,000	21,000	.....	55,000	.....	.....	.....	.....	42,000	.....	400,000[13]	.....
Franklin	.....	.....	.....	.....	16,000	Private plant.			.....	.....	.....	.....	.....
Greencastle	812	10,000	16,000	.....	.....	.....	.....	.....	.....	45,000	.....	.....	.....
Huntington	10,000	400	6,000	.....	750	1,000	.....	.....	.....	.....[5]	.....	.....	.....
Portland	500	1,000	.....	.....	1,500	.....	.....	.....	.....	100	.....	.....	.....
Plymouth	1,200	.....	1,600	.....	2,000	1,600	.....	.....	.....	3,000	.....	.....	.....
Richmond	.....	73,000	36,000	.....	.....	.....	.....	.....	.....	9,500	.....	.....	.....
Rushville	.....	.....	3,890	.....	2,400	.....	.....	.....	1,198	600	.....	.....	.....
Springfield	.....	67,064	21,161	.....	7,000	16,000	16,000	.....	.....	2,977	.....	.....	.....
Wabash	1,475	164,000	3,738	.....	.....	.....	.....	.....	.....	8,528	.....	.....	.....
Iowa:													
Cedar Falls	3,500	.....	7,500	.....	1,750	950	495	.....	.....	6,050	.....	.....	.....
Clinton	.....	.....	15,840	.....	.....[5]	.....	.....	.....	.....	12,500	.....	.....	.....
Creston	.....[8]	.....	.....	.....	.....	.....	.....	.....	.....	.....[5]	.....	.....	.....
Fairfield	3,000	.....	.....	.....	1,000	500	.....	1,800	.....	.....	.....	.....	.....

(For footnotes see page 18.)

TABLE No. 1—CONSTRUCTION WORK IN 352 CITIES DURING 1911 *(Continued)*

Name of city.	Streets.				Water works.					Sewerage			
	Grading.	Pavements.	Sidewalks and curbs.	Other construction.	Mains, etc.	Meters.	Pumping plant.	Reservoirs.	Other construction.	Sewer system.	Plants—Pumping.	Plants—Treatment.	Other construction work.
Iowa (Continued).													
Indianola	1,620	.....	1,200	.....	175	390	.....	.....	.....	24,994	.....	1,980	1,827
Lake City	3,000	.....	500	.....	.....	4,000	.....	.....	.....	.....	.....	.....	.....
Marengo	.....	.....	2,800	.....	400	.....	.....	3,000	.....	.....	.....	.....	.....
Marshalltown	1,500	18,000	5,500	.....	6,000	1,890	.....	.....	.....	4,000	.....	.....	.....
Muscatine	9,000	45,000	15,000	.....	22,600	.....	.....	.....	.....	8,000	.....	.....	1,000
Ottumwa	5,000	6,500	5,000	.....	45,000	.....	6,000	30,000	40,000[13]	45,000	.....	.....	.....
Perry	.....	.....	4,000	.....	.....	.....	.....	.....	3,500	.....	.....	.....	.....
Sioux City	30,000	120,000	49,000	.....	.....	.....	.....	.....	21,000[1]	43,000	.....	.....	.....
Kansas:													
Belleville	425	.....	650	.....	150	.....	.....	150	.....	.....	.....	.....	.....
Beloit	.....	.....	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coffeyville	.....	7,000	80,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Emporia	3,000	70,000	20,000	.....	16,000	20,000	16,000	.....	.....	7,000	.....	.....	.....
Fort Scott	.....	69,000	4,000	.....	6,000	.....	.....	10,000	.....	4,500	.....	.....	.....
Great Bend	5,000	.....	10,000	.....	.....	Private plant.			.....	100,000	.....	13,580	.....
Hutchinson	15,000	80,200	28,000	.....	35,000[1]	.....	.....	.....	.....	3,000	.....	.....	.....
Independence	10,000	80,000	1,500	.....	.....	.....	.....	.....	.....	9,000	.....	.....	.....
McPherson	2,660	36,860	6,000	.....	.....	.....	1,300	.....	.....	.....	.....	.....	.....
Manhattan	.....	80,000	.....	.....	.....	250	.....	.....	.....	100,000	.....	.....	.....
Osawotomie	2,000	.....	1,500	.....	400	600	.....	.....	.....	1,000	.....	.....	.....
Pittsburg	.....	17,373	3,843	.....	.....	.....	.....	.....	.....	989	.....	.....	.....
Salina	3,000	52,000	12,000	.....	.....	Private plant.			.....	10,000	.....	.....	.....
Topeka	21,195	117,142	42,172	.....	.....	.....	.....	.....	.....	.....	.....	.....	30,000
Kentucky:													
Belleville	6,000	35,000	9,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisville	.....	478,901	40,370	.....	.....	Private plant.			.....	95,990	.....	.....	.....
Ludlow	800	2,103	655	.....	.....	.....	.....	.....	.....	2,250	.....	.....	.....
Louisana:													
Crowley	.....	.....	125,000	.....	.....	.....	10,000	.....	.....	.....	.....	.....	.....
Lake Charles	.....	.....	10,000	.....	.....	.....	.....	.....	.....	10,000	8,000	.....	.....
Monroe	.....	.....	2,500	.....	.....	.....	2,000	.....	.....	14,000	.....	.....	.....
Maine:													
Pittsfield	200	.....	500	.....	700	.....	200	.....	.....	300	.....	.....	.....
Rockland	.....	25,000	3,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Saco	.....	3,500	.....	.....	.....	Private plant.			.....	15,000	.....	.....	.....
Waterville	1,800	15,000	1,000	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Maryland:													
Annapolis	512	4,629	1,742	.....	.....	Private plant.			.....	.....	.....	.....	.....
Baltimore	.....	500,000	15,000	.....	25,000	.....	.....	.....	.....	2,000,000	.....	.....	.....
Easton	.....	.....	805	.....	.....	Private plant.			.....	16,000	.....	8,200	.....
Westminster	500	800	400	.....	.....	Private plant.			.....	.....	.....	.....	.....
Massachusetts:													
Beverly	45,000	.....	14,000	.....	22,000	5,000	.....	.....	.....	81,000	.....	.....	.....
Cambridge	22,000	114,000	22,000	.....	16,000	5,000	.....	.....	.....	30,000	.....	.....	.....
Everett	7,000	25,000	30,200	.....	25,500	3,000	.....	.....	.....	15,000	.....	.....	.....
Greenfield	1,500	4,000	7,500	.....	20,000	.....	.....	40,000	.....	50,000	.....	.....	.....
Lowell	122,000	87,000	12,000	.....	25,000	1,000	20,000	.....	.....	70,000	.....	.....	12,000
Newton	1,000	20,000	20,000	.....	20,000	20,000	3,500	10,000	.....	26,000	.....	.....	.....
Westfield	4,000	30,000	4,500	.....	5,000	500	.....	.....	.....	10,000	.....	.....	.....
Michigan:													
Ann Arbor	4,132	62,309	2,646	.....	.....	Private plant.			.....	8,750	.....	.....	.....
Cadillac	2,150	7,392	6,672	.....	.....	Private plant.			.....	4,958	8,500	.....	.....
Durand	600	.....	2,000	.....	1,700	50	3,000	.....	.....	1,200	.....	.....	.....
Escanaba	900	16,000	9,000	.....	.....	Private plant.			.....	3,000	.....	.....	.....
Grand Rapids	254,865[1]	.....	.....	.....	42,385	9,900	.....	.....	260,000[10]	140,000	25,000	.....	.....
Kalamazoo	.....	20,000	22,000	.....	43,000	.....	.....	.....	.....	45,000	.....	.....	.....
Saginaw	.....	107,500	.....	.....	.....	.....	18,000	.....	.....	48,500	.....	.....	.....
Sault Ste. Marie	.....	4,748	3,500	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Minnesota:													
Bemidji	2,000	15,000	10,000	.....	3,000	.....	.....	.....	.....	7,000	.....	2,000	.....
Crookston	175	41,361	10,402	.....	3,500	Private plant.			.....	.....	.....	.....	.....
Lake City	.....	.....	10,000	.....	3,500	.....	.....	.....	.....	.....	.....	.....	.....
Mankato	.....	74,752	8,855	.....	427	578	2,600	.....	4,500	5,743	.....	.....	.....
Minneapolis	150,000	575,000	216,000	.....	896,000	.....	.....	265,000[14]	.....	630,000	.....	.....	.....
Montevideo	1,200	.....	1,000	.....	2,000	110	.....	.....	.....	5,150	.....	.....	.....
Red Wing	4,500	.....	10,500	.....	9,800	620	.....	.....	.....	7,100	.....	.....	.....
South St. Paul	17,382	.....	6,208	458	8,276	.....	.....	.....	.....	5,187	.....	.....	.....
Winona	.....	20,365	2,520	.....	7,000	.....	.....	.....	.....	6,700	.....	.....	.....
Mississippi:													
Columbus	500	500	6,500	.....	.....	.....	10,000	.....	.....	1,500	.....	.....	.....
Laurel	.....	.....	2,742	.....	6,000	.....	.....	.....	.....	480	.....	.....	.....
Vicksburg	6,735	.....	3,000	.....	22,000	.....	.....	.....	.....	9,354	17,507	.....	.....
Missouri:													
Brookfield	2,000	50,000	20,000	.....	5,000	700	.....	.....	.....	.....	.....	.....	.....
Butler	.....	.....	2,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carrollton	5,000	82,000	10,000	.....	.....	Private plant.			.....	.....	.....	.....	.....
Columbia	.....	67,400	11,400	.....	.....	.....	125,000	.....	.....	8,290	.....	.....	.....
De Soto	.....	.....	8,750	.....	1,400	.....	500	.....	.....	.....	.....	.....	700
El Dorado Springs	3,000	8,000	4,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fulton	1,594	28,355	5,164	.....	2,000	.....	.....	.....	.....	500	.....	.....	.....
Hannibal	600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Independence	.....	48,876	5,223	.....	.....	Private plant.			.....	.....[5]	.....	.....	.....
Kansas City	148,382	463,900	117,632	.....	294,941	.....	359,427	.....	.....	500,000	1,800	.....	.....
Kirksville	.....	14,000	8,000	.....	500	3,100	.....	.....	.....	3,000	.....	.....	.....
Lexington	.....	.....	3,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Liberty	250	25,000	4,000	.....	1,800	.....	10,000	.....	.....	300	.....	.....	.....
Palmyra	.....	500	.....	.....	500	.....	250	750	.....	2,000	.....	.....	.....
St. Charles	1,000	8,000	12,000	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....
Sedalia	5,000	34,500	6,000	.....	.....	.....	.....	.....	.....	30,000	.....	11,000	.....
Webb City	600	42,513	23,803	.....	.....	Private plant.			.....	3,407	.....	.....	422
Montana:													
Bozeman	.....	.....	15,000	.....	1,700	125	.....	22,000	.....	1,000	.....	.....	.....
Great Falls	54,031	6,000	64,849	.....	18,696	750	4,000	.....	.....	47,534	.....	.....	.....
Kalispel	.....	55,498	37,253	.....	25,000	.....	.....	.....	.....	16,746	.....	.....	.....
Missoula	10,370	840	34,600	.....	.....	Private plant.			.....	200,000	.....	.....	.....
Red Lodge	5,000	.....	1,800	.....	2,100	.....	.....	800	.....	12,000	.....	1,200	.....
Nebraska:													
Blair	50	.....	290	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crete	500	.....	3,500	.....	3,800	2,500	1,000	.....	.....	22,000	1,500	.....	.....
Grand Island	.....	6,000	3,000	.....	14,000	1,500	4,600	.....	.....	9,250	.....	.....	.....
Maywood	.....	.....	.....	.....	2,200	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk	3,000	.....	6,000	.....	500	.....	2,500	.....	.....	4,500	.....	.....	.....
South Omaha	85,751	333,973	6,600	.....	.....	Private plant.			.....	123,744	.....	.....	.....
Tecumseh	1,000	.....	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(For footnotes see page 18.)

TABLE No. 1—CONSTRUCTION WORK IN 352 CITIES DURING 1911 *(Continued)*

Name of city.	Streets.				Water works.					Sewerage			
											Plants		
	Grading.	Pavements.	Sidewalks and curbs.	Other construction.	Mains, etc.	Meters.	Pumping plant.	Reservoirs.	Other construction.	Sewer system.	Pumping.	Treatment.	Other construction work.
New Hampshire:													
Laconia	2,000	19,000	2,000	.....	.....	Private plant.			.....	2,000	.....	.....	.....
Portsmouth	50,000	40,000	5,000	.....	3,000	2,000	1,500	8,000	.....	3,000	.....	.....	.....
New Mexico:													
Albuquerque	.....	.....	.....	.....	.....	Private plant.			.....	325,000	.....	.....	.....
New Jersey:													
Bayonne	.....	100,000	8,000	.....	13,200	4,000	.....	.....	.....	7,100	.....	.....	.....
Bloomfield	22,000	12,000	9,000	.....	9,000	300	.....	.....	.....	30,000	.....	.....	.....
Boonton	500	3,000	500	.....	2,000	.....	.....	.....	.....	.....	.....	.....	.....
East Orange	4,819	17,238	29,616	.....	.....	.....	.....	.....	.....	1,614	.....	.....	.....
Elizabeth	.....	60,000	1,500	.....	.....	.....	.....	.....	.....	250,000	14,000	.....	.....
Garfield	12,815	3,775	23,120	.....	3,000	3,000	850	.....	.....	74,760	.....	.....	.....
Long Branch	1,000	10,000	5,000	.....	.....	Private plant.			.....	.....	.....	.....	.....
New Brunswick	2,000	65,000	4,000	.....	8,000	2,000	.....	.....	.....	6,000	.....	.....	.....
Vineland	3,000	.....	.....	.....	500	1,000	2,250	.....	.....	500	.....	.....	.....
New York:													
Batavia	.....	.....	4,000	.....	16,000	.....	.....	.....	.....	225,000	30,000	45,000	.....
Binghamton	7,800	46,000	22,560	.....	.....	.....	.....	.....	.....	41,475	.....	.....	.....
Cohoes	.....	.....	.....	.....	.....	.....	.....	.....	140,000[10]	1,500	.....	.....	.....
Cortland	1,000	15,000	6,000	.....	4,000	.....	.....	17,000	.....	5,000	.....	.....	.....
Dunkirk	.....	59,957	20,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Geneva	.....	.....	.....	.....	60,000	2,365	26,250	30,000	60,000[14]	.....	.....	.....	.....
Hoosick Falls	2,000	12,000	400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hornell	4,600	2,100	.....	.....	9,000	.....	2,000	40,000	.....	2,100	.....	.....	.....
Hudson	.....	40,000	1,500	.....	5,500	.....	.....	4,800	.....	5,900	.....	.....	.....
Hudson Falls	1,000	3,800	1,600	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Jamestown	5,000	90,000	10,000	.....	22,500	9,343	1,000	.....	.....	15,000	.....	.....	.....
Massena	5,000	2,000	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	30,000
Newark	4,000	.....	10,000	.....	5,000	.....	5,000	.....	.....	.....	.....	.....	.....
Niagara Falls	500	90,000	5,000	.....	.....	.....	.....	.....	.....	115,000	.....	.....	80,000
Oneida	.....	16,000	1,500	.....	.....	.....	.....	.....	.....	1,000	.....	.....	.....
Poughkeepsie	10,000	150,000	25,000	.....	13,500	2,500	30,000	.....	.....	25,000	.....	.....	.....
Salamanca	1,200	7,000	10,500	.....	800	.....	500	200	.....	500	.....	.....	.....
Watervliet	.....	25,000	1,000	.....	.....	Private plant.			.....	.....	.....	.....	.....
White Plains	3,000	5,000	12,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
North Carolina:													
Charlotte	.....	.....	5,000	.....	.....	.....	.....	.....	.....	26,500	.....	13,000	.....
Goldsboro	200	525	200	.....	.....	1,200	1,800	.....	.....	2,000	.....	.....	.....
Greensboro	5,000	2,000	2,500	.....	5,000	1,000	35,000	.....	.....	1,000	.....	.....	.....
Wilson	75	4,500	.....	.....	1,800	600	400	.....	.....	.....	.....	.....	.....
North Dakota:													
Bismarck	5,000	.....	10,000	.....	3,500	.....	.....	.....	.....	1,000	.....	.....	.....
Dickinson	1,000	.....	5,000	.....	400	.....	1,000	.....	.....	.....	.....	.....	.....
Grand Forks	.....	120,832	7,000	.....	17,734	.....	.....	.....	.....	3,576	.....	.....	.....
Valley City	4,000	1,000	1,000	.....	5,000	350	5,000	.....	.....	1,000	.....	.....	2,500
Ohio:													
Ada	.....	2,500	1,000	.....	.....	Private plant.			.....	500	.....	.....	.....
Alliance	8,000	100,000	35,000	.....	7,000	500	7,000	.....	.....	35,000	.....	.....	.....
Bellefontaine	.....	.....	30,000	.....	.....	.....	.....	.....	.....	95,000	.....	20,000	.....
Bowling Green	1,000	7,000	4,200	.....	600	.....	.....	.....	.....	.....	.....	.....	.....
Brookville	.....	18,000	.....	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Canton	25,000	480,000	80,000	.....	.....	.....	15,000	.....	25,000	.....	.....	.....	.....
Carthage	800	2,000	2,000	.....	.....	.....	.....	.....	.....	45,000	3,000	.....	.....
Chicago	2,000	9,500	.....	.....	.....	.....	.....	.....	.....	1,500	.....	.....	.....
Circleville	.....	210,000[15]	.....	.....	.....	.....	.....	.....	.....	25,000	2,000	.....	.....
Cleveland	.....	849,880	54,280	.....	296,900	33,926	155,170	.....	.....	378,700	.....	.....	.....
Dayton	7,000	500,000	15,000	.....	46,500	15,000	.....	.....	.....	150,000	.....	.....	.....
Delaware	2,000	25,000	.....	.....	.....	Private plant.			.....	.....	.....	.....	.....
East Palestine	.....	18,000	2,000	.....	.....	.....	5,000	.....	.....	2,000	.....	.....	.....
Findlay	.....	13,390	1,400	.....	.....	.....	.....	.....	.....	11,000	.....	.....	.....
Lorain	.....	40,000	7,000	.....	15,000	2,000	.....	.....	.....	70,000	.....	.....	.....
Marion	2,000	25,000	15,100	.....	.....	Private plant.			.....	3,000	.....	200	.....
Miamisburg	.....	.....	.....	.....	3,000	.....	.....	.....	.....	16,000	.....	.....	.....
Monroeville	.....	18,000	.....	.....	.....	.....	.....	.....	.....	2,200	.....	.....	.....
Monticello	.....	.....	.....	7,000[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Napoleon	600	2,000	1,000	.....	.....	.....	.....	.....	.....	1,500	.....	.....	.....
Niles	.....	.....	8,250	.....	30,000	.....	35,000[13]	.....	.....	49,200	.....	.....	.....
Norwalk	.....	14,000	.....	.....	10,000	.....	.....	.....	.....	5,100	.....	.....	.....
Norwood	.....	64,227[16]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oberlin	.....	17,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pomeroy	.....	25,000	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ravenna	.....	18,500	7,500	.....	1,800	.....	.....	.....	.....	2,056	.....	.....	.....
Springfield	16,000	107,000	17,000	.....	52,000	1,000	.....	.....	.....	40,500	.....	.....	28,000
Warren	1,000	.....	.....	.....	.....	Private plant.			.....	20,000	.....	.....	35,000
Oklahoma:													
Altus	500	160,000	500	435	1,200	.....	9,000	.....	.....	8,500	.....	6,000	.....
Bartlesville	5,000	65,000	1,000	.....	.....	Private plant			.....	1,625	.....	.....	.....
Chandler	.....	.....	.....	.....	.....	1,000	.....	.....	10,000	.....	.....	.....	.....
Clinton	3,000	.....	2,000	.....	1,000	300	3,000	.....	.....	30,000	.....	.....	.....
Durant	.....	37,000[17]	5,000	.....	2,500	.....	20,000	.....	.....	900	.....	.....	.....
El Reno	.....	.....	5,000	.....	20,000	2,000	30,000	.....	.....	.....	.....	.....	.....
Mangum	2,000	.....	4,000	.....	20,000	10,000	.....	.....	.....	20,000	.....	.....	.....
Miami	.....	16,800	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Muskogee	50,000	500,000	25,000	.....	15,000	25,000	5,000	.....	.....	300,000	.....	.....	.....
Oklahoma City	88 929	990,321	85,341	.....	221,116	28,883	.....	19,581	.....	200,000	.....	8,949	.....
Okmulgee	3,000	.....	20,000	.....	34,000	1,000	7,000	20,000	3,000	15,000	.....	.....	.....
Park Valley	1,000	40,600	20,000	.....	2,800	750	.....	13,000	.....	.....	.....	.....	5,000
Pawhuska	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sulphur	40,000	.....	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tulsa	24,800	425,000	26,000	.....	24,400	365	20,000	.....	.....	58,000	.....	.....	.....
Wagoner	.....	.....	.....	60,000[1]	.....	.....	.....	.....	.....	5,000[1]	.....	.....	.....
Oregon:													
Baker	.....	218,598	24,397	.....	1,250	2,014	.....	27,834	.....	16,430	.....	.....	.....
Grant's Pass	21,000	40,000	8,750	.....	.....	Private plant.			.....	8,000	.....	.....	.....
McMinnville	.....	.....	8,000	.....	.....	.....	15,000[12]	.....	.....	13,000	.....	.....	.....
Oregon City	20,000	40,000	50,000	.....	10,000	.....	.....	.....	.....	10,000	.....	.....	.....
Portland	6,700,000[1]	.....	.....	.....	500,000	18,500	.....	180,000	585,000	556,291	.....	.....	.....
The Dalles	7,000	.....	5,000	.....	20,000	.....	.....	15,000	.....	.....	.....	.....	.....
Pennsylvania:													
Athens	.....	.....	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beaver Falls	5,000	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bethlehem	1,000	7,000	.....	.....	2,000	.....	3,000	.....	.....	.....	.....	.....	.....
Carlisle	3,000	7,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Edwardsville	.....	8,000	2,500	.....	.....	.....	.....	.....	.....	800	.....	.....	.....
Franklin	500	60,000	2,000	.....	3,000	.....	18,000	.....	.....	200	.....	.....	.....

(For footnotes see page 18.)

TABLE No. 1—CONSTRUCTION WORK IN 352 CITIES DURING 1911 *(Continued)*

Name of city.	Streets.				Water works.					Sewerage			
	Grading.	Pavements.	Sidewalks and curbs.	Other construction.	Mains, etc.	Meters.	Pumping plant.	Reservoirs.	Other construction.	Sewer system.	Plants—Pumping.	Plants—Treatment.	Other construction work.
Pennsylvania (Continued).													
Gallitzin	.....	.....	400	.....	1,700	.....	.....	.....	.....	.....	.....	.....	.....
Girardville	.....	12,000	.....	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Harrisburg	30,000	260,000	90,000	.....	40,000	.....	25,000	20,000	.....	90,000	.....	.....	.....
Holidaysburg	1,500	.....	4,500	.....	.....	.....	.....	.....	.....	600	.....	.....	.....
Homestead	.....	.....	40,808	.....	486	.....	.....	.....	.....	.....	.....	.....	.....
Indiana	.....	55,000	5,000	.....	.....	.....	.....	.....	.....	3,500	.....	.....	.....
McKeesport	.....	40,000	5,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Meadville	.....	12,000	6,000	.....	.....	.....	.....	.....	.....	5,800	.....	.....	.....
Norristown	30,000	90,000	3,500	.....	.....	.....	.....	.....	.....	1,500	.....	.....	.....
Oil City	9,100	36,000	11,200	18,000	19,512	7,400	200	.....	.....	.....	.....	.....	650
Reading	.....	20,000	1,000	.....	.....	.....	.....	.....	.....	500	.....	.....	.....
Sayre	1,225	18,325	1,925	.....	.....	Private plant.			.....	.....	.....	.....	.....
Shamokin	.....	20,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sharpsville	.....	6,000	5,016	.....	.....	.....	.....	.....	.....	12,500	.....	.....	.....
South Bethlehem	1,500	.....	.....	.....	.....	Private plant.			.....	38,000	.....	.....	.....
Warren	.....	15,000	3,500	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Wolkes-Barre	2,500	175,597	12,345	.....	.....	Private plant.			.....	44,083	.....	.....	.....
Williamsport	3,000	9,130	1,989	.....	.....	.....	.....	.....	.....	9,560	.....	.....	.....
Rhode Island:													
Cranston	.....	27,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport	.....	.....	.....	.....	.....	Private plant.			.....	25,000	.....	.....	.....
Woonsocket	.....	.....	5,000	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
South Carolina:													
Chester	2,000	.....	.....	.....	1,600	800	.....	.....	.....	1,000	.....	.....	.....
Columbia	.....	.....	.....	143,000[1]	.....	.....	.....	.....	.....	.....	.....	.....	5,800
Orangeburg	2,000	.....	2,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
South Dakota:													
Aberdeen	.....	.....	30,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Huron	2,000	.....	1,000	.....	2,500	1,000	45,000	.....	.....	10,000	.....	.....	.....
Mitchell	4,200	.....	3,800	.....	4,703	1,500	.....	350	.....	1,899	.....	.....	.....
Rapid City	.....	.....	16,000	.....	30,000	1,000	.....	10,000	.....	.....	.....	.....	.....
Yankton	500	.....	2,000	.....	1,200	1,600	.....	.....	.....	2,450	.....	.....	.....
Tennessee:													
Johnson City	6,000	60,000	9,000	.....	.....	.....	.....	.....	.....	2,400	.....	.....	.....
Texas:													
Bryan	.....	.....	6,000	.....	15,000	2,000	.....	5,000	.....	10,000	.....	1,500	.....
Dennison	5,500	22,325	10,000	.....	37,500	1,200	18,500	47,000	.....	.....	.....	.....	.....
El Paso	25,000	103,432	.....	82,000	75,000	.....	.....	.....	15,000	36,400	.....	100,000	.....
Ennis	5,000	.....	10,000	.....	17,500	.....	6,500	3,500	.....	.....	.....	.....	.....
Mineral Wells	.....	.....	1,500	.....	.....	.....	.....	.....	.....	500	.....	.....	.....
Paris	.....	19,000	4,750	.....	8,000	4,000	6,000	.....	.....	12,000	.....	.....	.....
San Antonio	100,000	60,000	12,000	.....	.....	.....	.....	.....	.....	39,000	.....	.....	.....
Utah:													
Ogden	.....	.....	35,483	.....	82,100	.....	.....	17,826	77,527	10,777	.....	.....	.....
Salt Lake	87,700	288,200	137,500	.....	147,215	.....	.....	6,245	.....	173,360	.....	.....	19,935
Vermont:													
St. Albans	450	18,000	3,000	.....	3,000	.....	.....	2,000	.....	750	.....	.....	.....
Virginia:													
Newport News	1,000	3,000	3,500	.....	.....	Private plant.			.....	2,500	.....	.....	.....
Suffolk	2,000	.....	1,500	.....	.....	Private plant.			.....	2,500	.....	.....	.....
Washington:													
Aberdeen	237,203	77,687	36,029	45,180	10,000	1,000	1,000	.....	.....	26,446	.....	.....	.....
Bellingham	29,357	64,347	30,284	.....	18,000	1,053	.....	.....	.....	8,290	.....	.....	.....
Dayton	.....	64,000	12,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Everett	82,575	164,953	65,493	.....	.....	.....	.....	.....	.....	15,201	.....	.....	.....
Hoquiam	83,500	47,168	14,845	.....	.....	.....	.....	.....	.....	53,601	.....	.....	.....
North Yakima	31,550	175,000	73,700	.....	.....	Private plant.			.....	53,500	.....	.....	25,000
Port Angeles	.....	.....	1,000	.....	.....	Private plant.			.....	.....[5]	.....	.....	.....
Port Townsend	3,770	.....	9,372	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle	[15]1,885,061	1,147,415	.....	.....	375,023	.....	.....	418,478	.....	1,417,827	.....	.....	308,733
Vancouver	[15]66,470	269,000	.....	.....	85,000	.....	20,000	.....	.....	46,000	.....	.....	.....
West Virginia:													
Charleston	1,000	3,000	4,000	.....	.....	Private plant.			4,000	.....	.....	.....	.....
Clarksburg	.....	27,000	6,000	.....	.....	.....	.....	.....	150,000[1]	20,000[1]	.....	.....	.....
Moundsville	1,000	5,700	3,000	.....	.....	.....	.....	.....	.....	60,000	.....	.....	.....
Wisconsin:													
Antigo	2,500	12,000	8,000	.....	3,000	.....	3,000	6,000	.....	3,250	.....	.....	.....
Appleton	.....	58,133	10,868	.....	.....	Just purchased by city.			.....	10,915	.....	.....	.....
Baraboo	2,000	.....	7,300	.....	2,100	200	1,600	175	.....	1,500	.....	.....	.....
Beloit	.....	.....	8,000	.....	.....	Private plant.			.....	8,000	.....	.....	.....
Burlington	1,500	21,000	4,000	.....	5,000	250	500	1,200	.....	3,000	.....	.....	.....
Chippewa Falls	.....	1,000	.....	.....	3,000	.....	.....	.....	.....	18,500	.....	.....	.....
Fond du Lac	.....	42,000	26,400	.....	.....	.....	.....	.....	20,000[18]	2,685	.....	.....	.....
Fort Atkinson	4,000	2,500	1,100	.....	8,000	.....	.....	.....	.....	1,500	.....	.....	.....
Green Bay	.....	56,000[15]	34,000	.....	.....	Private plant.			.....	29,000	.....	.....	.....
Janesville	.....	10,000	15,000	.....	.....	Private plant.			.....	11,950	.....	.....	.....
Kenosha	9,000	45,000	18,000	.....	.....	.....	.....	.....	.....	130,000	.....	.....	.....
La Crosse	.....	.....	.....	.....	70,000	.....	.....	.....	.....	.....	.....	.....	.....
Manitowoc	15,000	.....	10,000	.....	.....	Purchased by city, Oct. 1.			.....	15,000	.....	.....	.....
Marinette	.....	12,000	7,000	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Oconomowoc	.....	8,762	.....	.....	.....	.....	.....	.....	.....	9,531	.....	.....	.....
Oshkosh	.....	39,120	39,100	.....	.....	.....	.....	.....	.....	14,136	.....	.....	.....
Superior	.....	114,184	39,132	.....	.....	.....	.....	.....	.....	13,051	.....	.....	.....
Two Rivers	.....	.....	.....	.....	10,000	.....	.....	.....	.....	3,500	.....	.....	.....
Waukesha	1,152	3,500	8,400	.....	5,000	1,000	1,000	.....	.....	5,000	.....	.....	.....
Wyoming:													
Sheridan	11,365	218,776	12,500	.....	29,000	.....	.....	.....	.....	11,000	.....	.....	.....

[1] All kinds of work under this general head.
[2] Garbage destructor.
[3] Reconstruction of gas mains $125,000; reinforced concrete culverts, $4,700; ornamental street lighting, $4,000.
[4] Nothing spent for construction in 1911, nor contemplated for 1912. Office of city engineer abolished in the interest of economy.
[5] Nothing spent under this general head.
[6] Municipal hydro-electric plant.
[7] $30,000 for water works and sewerage system under general contract.
[8] Addition to plant purchased in 1911 for $699,000.
[9] Miscellaneous improvements including fire stations.
[10] Filters.
[11] Improvement at lighting plant.
[12] Building filtration plant.
[13] Also includes filters.
[14] Filter plant and new intake and crib.
[15] Also includes sidewalks and curbs.
[16] Grading and macadamizing.
[17] Includes grading, curbing and gutter, storm sewers, etc.
[18] Purchased by city, Dec. 1, 1911.
[19] Includes curbing.

TABLE No. 2
APPARATUS PURCHASED IN 1911

Name of city.	For street work: Rollers, graders, scrapers, plows, etc.	For street work: Other kinds.	For street cleaning. Carts, flushers, brooms, sprinklers, etc.	Other apparatus.
Alabama:				
Montgomery	$2,000	.....	$1,000	.....
Arkansas:				
Helena	300	.....	500	.....
Little Rock	2,000	.....	1,000	.....
Pine Bluff	1,000	.....	350	.....
California:				
Fresno	7,000	.....	.....	.....
Modesto	5,000	.....	2,000	.....
San Bernardino	.....	.....	.....	.....
Santa Monica	1,000	.....	300	.....
Vallejo	.....	.....	5,000	.....
Colorado:				
Colorado Springs	.....	.....	500	.....
Longmont	.....	.....	100	.....
Connecticut:				
Norwich	.....	.....	9,500	.....
Putnam	4,000	.....	.....	.....
Florida:				
Sarasota	.....	.....	750	.....
Georgia:				
Americus	.....	.....	1,500	.....
Columbus	.....	.....	1,650	.....
Macon	1,000	.....	.....	.....
Waycross	.....	.....	1,000	.....
Illinois:				
Bloomington	.....	.....	400	.....
Carlinville	200	.....	200	.....
Harvey	500	.....	.....	.....
Oak Park	2,500	.....	1,000	.....
Springfield	500	.....	1,000	.....
Indiana:				
Bedford	.....	.....	1,125	.....
Boonville	300	.....	.....	.....
Brazil	200	.....	.....	.....
Crawfordsville	500	.....	200	.....
Huntington	.....	.....	500	.....
Richmond	2,000	.....	.....	.....
Rushville	.....	.....	100	.....
Iowa:				
Cedar Falls.	270	.....	.....	.....
Marengo	.....	.....	350	.....
Muscatine	.....	.....	2,000	.....
Perry	.....	.....	250	.....
Sioux City	.....	.....	.....	6,500[2]
Kansas:				
Coffeyville	1,500	.....	.....	.....
Fort Scott	100	.....	100	.....
Great Bend	200	.....	.....	.....
Hutchinson	1,000	.....	.....	.....
Manhattan	.....	.....	250	.....
Osawotomie	100	.....	.....	.....
Pittsburg	2,300	.....	.....	.....
Saline	1,000	.....	500	.....
Louisiana				
Lake Charles	1,000	.....	600	.....
Maine:				
Pittsfield	225	.....	.....	.....
Maryland:				
Annapolis	.....	.....	140	.....
Massachusetts:				
Cambridge	3,500	.....	.....	.....
Lowell	.....	.....	800	.....
Newton	2,000	.....	1,000	.....
Westfield	.....	500	.....	.....
Michigan:				
Ann Arbor	.....	2,000	.....	.....
Escanaba	2,000	.....	300	.....
Grand Rapids	2,000	.....	2,000	.....
Sault Ste. Marie	.....	263	18	.....
Minnesota:				
Mankato	200	.....	1,200	.....
Red Wing	2,500	.....	215	.....
Mississippi:				
Vicksburg	7,852	.....	3,573	.....
Missouri:				
Brookfield	.....	.....	500	.....
Carrollton	.....	.....	750	.....
Columbia	.....	.....	100	.....
Fulton	2,140	.....	.....	.....
Hannibal	3,000	.....	.....	.....
Kansas City	28,000	20,000	10,000	.....
Kirksville	.....	.....	1,800	.....
Liberty	.....	.....	2,000	.....
Palmyra	100	.....	.....	.....
St. Charles	2,500	.....	285	.....
Sedalia	500	.....	.....	.....
Montana:				
Great Falls.	.....	.....	350	.....
Kalispel	10,060	.....	.....	.....
Missoula	300	.....	.....	.....
Red Lodge	700	.....	500	.....
Nebraska:				
Norfolk	.....	.....	300	.....
Tecumseh	500	.....	.....	.....
New Hampshire:				
Laconia	500	.....	1,800	.....
Portsmouth	1,000	.....	500	.....
New Jersey:				
Bloomfield	5,000	.....	.....	.....
East Orange	.....[1]	.....	.....	.....
New York:				
Binghamton	315	2,000[3]	830	750[4]
Cortland	500	.....	.....	.....
Hudson Falls	.....	.....	300	.....
Jamestown	3,000	.....	1,500	.....
Newark	.....	.....	500	.....
New York (Continued)				
Oneida	125	.....	215	.....
Poughkeepsie	200	.....	900	.....
Salamanca	200	.....	100	.....
North Carolina:				
Charlotte	1,800	.....	.....	.....
Goldsboro	350	.....	500	.....
Greensboro	1,500	.....	2,000	.....
North Dakota:				
Bismarck	700	.....	.....	.....
Dickinson	500	.....	.....	.....
Grand Forks	.....	.....	1,000	.....
Valley City	500	.....	300	.....
Ohio:				
Alliance	25	.....	.....	.....
Canton	.....	.....	1,500	.....
Circleville	.....	.....	300	.....
East Palestine	.....	.....	500	.....
Napoleon	350	.....	.....	.....
Pomeroy	.....	.....	500	.....
Warren	250	.....	100	.....
Oklahoma:				
Clinton	300	.....	600	.....
Durant	350	.....	.....	.....
Miami	.....	.....	650	.....
Oklahoma City	.....	.....	2,000[3]	.....
Okmulgee	.....	.....	100	.....
Paul's Valley	2,000	.....	1,000	.....
Oregon:				
Baker	.....	.....	849	.....
Grant's Pass	.....	.....	1,270	.....
The Dalles	250	1,650	.....	.....
Pennsylvania:				
Athens	200	.....	15	.....
Beaver Falls	.....	.....	100	.....
Bethlehem	150	.....	.....	.....
Carlisle	.....	.....	800	.....
Edwardsville	.....	.....	600	.....
Franklin	100	.....	100	.....
Harrisburg	.....	.....	1,000	.....
Meadville	800	.....	500	.....
Norristown	150	.....	.....	.....
Sharpsville	25	.....	1,300	.....
Williamsport	60	.....	110	.....
Rhode Island:				
Cranston	2,600	.....	.....	.....
South Carolina:				
Columbia	2,500	.....	1,200	.....
South Dakota:				
Huron	500	.....	.....	.....
Mitchell	50	.....	25	.....
Texas:				
Ennis	3,600	.....	.....	.....
Paris	500	.....	.....	.....
Utah:				
Salt Lake City	.....	.....	.....	12,000
Vermont:				
St Albans	.....	.....	450	.....
Virginia:				
Newport News	250	.....	150	.....
Washington:				
Aberdeen	.....	.....	1,500	.....
North Yakima	.....	.....	2,200	.....
Vancouver	.....	.....	2,000	8,000
West Virginia:				
Charleston	.....	.....	500	.....
Wisconsin:				
Antigo	2,600	.....	.....	.....
Burlington	2,200	.....	300	.....
Chippewa Falls.	150	.....	300	.....
Green Bay	.....	.....	500	.....
Manitowoc	500	.....	1,000	.....
Marinette	200	.....	.....	.....
Two Rivers	.....	.....	500	.....
Wyoming:				
Sheridan	.....	.....	450	.....

[2] Includes all kinds of apparatus.
[3] Traction engine.
[4] Stewart sewer cleaning machine.

MUNICIPAL WORK IN 1911 AND 1912

(*Continued from page 14.*)

could not be included under either of these heads cost $12,300; a total of $201,015. If we make the same assumptions concerning these figures as we did concerning street work in large and small cities, we have an estimated expenditure for the purpose of apparatus of $400,000. This, of course, by no means represents the total amount of apparatus used for municipal work, since a very large percentage of such work is done by contractors, and these figures represent only purchases of new apparatus made by the cities themselves during the year 1911.

Table 4 gives a forecast of what purchases of apparatus will probably be made in 1912, the totals of the several items being as follows: Rollers, graders and other street construction apparatus, $81,600. Carts, flushers, sprinklers and other street cleaning apparatus, $86,500. Apparatus not classified under either of these heads, $9,500; giving a total of $177,600. The great majority of cities, however, could give no estimate of what apparatus would probably be purchased this year.

TABLE No. 3
FORECAST OF WORK TO BE DONE IN 1912

Name of city.	Streets.				Water works.					Sewerage			
											Plants		
	Grading.	Pavements.	Sidewalks and curbs.	Other construction.	Mains, etc.	Meters.	Pumping plant.	Reservoirs.	Other construction.	Sewer system.	Pumping.	Treatment.	Other construction work.
Alabama:													
Bessemer	$5,000	$15,000	$2,500	.....	.....	Private plant.			.....	.....[1]	.....	.....	.....
Florence	.....	.....	.....	.....	.....[1]	.....	.....	.....	.....	.....[1]	.....	.....	.....
Gadsden	5,000	.....	18,000	.....	25,000	$5,000	.....	$25,000	.....	.....[1]	.....	.....	.....
Montgomery	.....	.....	.....	$200,000[2]	.....	.....	.....	.....	$10,000[2]	$25,000	.....	.....	.....
Troy	.....	.....	.....	.....	15,000	.....	$10,000	.....	.....	.....	.....	.....	.....
Arizona:													
Phoenix	.....	250,000	10,000	.....	.....	.....	.....	.....	.....	410,000	.....	.....	.....
Arkansas:													
Helena	3,000	80,000	5,000	.....	.....	Private plant.			.....	.....[1]	.....	.....	.....
Little Rock	75,000	750,000	40,000	.....	.....	Private plant.			.....	150,000	.....	.....	.....
Pine Bluff	10,000	100,000	15,000	.....	4,000	3,660	.....	.....	.....	19,000	.....	.....	$6,000[3]
California:													
Benecia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fresno	100,000[12]	100,000	50,000	.....	.....	Private plant.			.....	25,000	.....	.....	.....
Los Angeles	.....	.....	.....	1,300,000[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Modesto	.....	160,000	5,000	.....	60,000	.....	.....	.....	.....	15,000	.....	.....	.....
Riverside	.....	125,000	125,000	.....	.....	.....	.....	.....	.....	20,000	.....	.....	.....
San Bernardino	2,000	60,000	15,000	10,000	.....	.....	.....	.....	.....	35,000	.....	.....	.....
Santa Monica	150,000[2]	.....	.....	.....	.....	Private plant.			.....	.....	.....	.....	.....
Vallejo	.....	150,000	20,000	.....	.....	5,000	.....	.....	.....	10,000	.....	.....	100,000[4]
Visalia	800	10,000	5,000	.....	5,000	.....	.....	.....	.....	2,000	.....	.....	.....
Colorado:													
Colorado Springs	45,000	150,000	42,000	.....	.....	.....	.....	16,000	.....	2,000	.....	.....	.....
Fort Collins	7,000	.....	2,500	.....	3,000	.....	.....	.....	.....	1,500	.....	.....	.....
Leadville	.....[1]	.....	.....	.....	.....[1]	.....	.....	.....	.....	.....[1]	.....	.....	.....
Longmont	3,000	10,000	1,500	.....	.....[1]	.....	.....	.....	.....	.....[1]	.....	.....	.....
Connecticut:													
Ansonia	2,000	5,000	3,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Derby	3,000	4,000	1,500	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Greenwich	.....	55,000	5,000	.....	.....	Private plant.			.....	.....	.....	.....	.....
Norwich	2,000	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Putnam	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....
Southington	.....	.....	.....	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....
Stamford	5,000	45,000	20,000	.....	.....	Private plant.			.....	5,000	.....	.....	.....
Florida:													
Palatka	.....	27,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sarasota	500	.....	25,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia:													
Albany	30,000	30,000	10,000	.....	4,000	5,000	.....	.....	.....	14,000	.....	.....	70,000[5]
Americus	2,500	.....	10,000	.....	.....	600	.....	.....	.....	.....	.....	.....	.....
Columbus	12,000	60,000	10,000	.....	.....	Private plant.			.....	12,000	.....	.....	.....
Gainesville	.....[1]	.....	.....	.....	2,000	1,500	.....	.....	.....	5,250	.....	.....	.....
Macon	.....	30,000	10,000	.....	.....	.....	.....	.....	.....	50,000	.....	.....	.....
Rome	.....	.....	.....	125,000[2]	30,000	.....	35,000	.....	.....	40,000	.....	.....	.....
Waycross	6,000	12,000	100,000	.....	1,000	150	.....	.....	.....	4,000	.....	.....	.....
Idaho:													
Boise	.....	600,000	5,000	.....	.....	.....	.....	.....	.....	40,000	.....	.....	.....
Lewiston	15,000	60,000	20,000	.....	10,000	1,000	.....	.....	.....	.....	.....	.....	.....
Pocatello	5,000	.....	20,000	.....	152,000	.....	36,000	65,000	.....	100,000	.....	$10,000	.....
Illinois:													
Alton	1,000	80,000	20,000	.....	.....	Private plant.			.....	100,000	.....	.....	.....
Aurora	.....	80,000	.....	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Bloomington	8,000	75,000	15,000	.....	55,000	.....	.....	.....	.....	10,000	.....	.....	.....
Canton	1,500	26,000	.....	.....	8,000	12,000	2,000	.....	.....	5,000	.....	.....	.....
Carlinville	500	5,000	3,000	.....	500	.....	.....	1,000	.....	2,000	.....	.....	.....
East St. Louis	40,000	460,000	75,000	.....	.....	.....	.....	.....	.....	800,000	.....	.....	.....
Galena	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....[1]	.....	.....	.....
Galva	.....	1,700	8,000	.....	.....	1,000	.....	.....	.....	5,000	.....	.....	.....
Greenville	150	9,000	.....	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Harvey	.....	250,000	.....	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Jerseyville	.....	55,000	2,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Joliet	3,000	30,000	10,000	.....	10,000	5,000	15,000	.....	10,000	20,000	.....	.....	.....
Lake Forest	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lincoln	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marengo	.....	.....	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marion	.....	15,000	105,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Normal	.....	30,000	7,000	.....	1,100	.....	15,000	4,000	.....	.....	.....	.....	.....
Mattoon	.....	125,000	5,000	.....	.....	.....	.....	.....	.....	45,000	.....	.....	.....
Moline	.....	195,200	30,000	.....	15,000	.....	.....	.....	.....	20,000	.....	.....	.....
Oak Park	6,000	85,000	35,000	.....	15,000	3,000	4,000	.....	.....	15,000	.....	.....	.....
Pekin	.....	150,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rock Island	.....	.....[6]	.....	.....	14,000	.....	.....	.....	.....	.....	.....	.....	.....
St. Charles	.....	.....	.....	.....	10,000	.....	.....	.....	.....	100,000	.....	.....	.....
Springfield	.....	136,000	51,300	.....	7,000	16,000	100,000	.....	.....	30,000	.....	.....	.....
Streator	.....	18,000	5,000	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....
Taylorville	3,400	50,000	1,000	.....	5,000	.....	1,000	500	.....	3,500	.....	.....	.....
Urbana	.....	75,000	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vandalia	.....	24,000	7,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waukegan	.....	50,000	.....	.....	.....	.....	6,000	.....	.....	8,000	.....	.....	.....
Indiana:													
Auburn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bedford	.....	.....	.....	.....	2,500	500	5,000	10,000	.....	.....	.....	.....	.....
Bloomington	6,000	40,000	36,000	.....	8,000	.....	.....	.....	.....	8,000	.....	.....	.....
Boonville	.....[1]	.....	.....	.....	.....	200	.....	.....	.....	100,000	5,000	.....	.....
Brazil	.....	3,000	.....	.....	1,000	800	.....	.....	.....	.....	.....	20,000	.....
Crawfordsville	10,000	25,000	15,000	.....	4,000	2,400	.....	.....	.....	4,000	.....	.....	.....
Evansville	.....	80,000	21,000	.....	.....	.....	.....	.....	.....	40,000	.....	.....	.....
Franklin	.....	.....	.....	12,000[2]	.....	Private plant.			.....	8,000	.....	.....	.....
Greencastle	.....	.....	12,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huntington	5,000	40,000	3,000	.....	.....	2,000	.....	.....	.....	.....[1]	.....	.....	.....
Lake Forest	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portland	.....	10,000	1,000	.....	1,500	.....	.....	.....	.....	8,000	.....	.....	.....
Plymouth	2,000	14,000	2,000	.....	4,000	.....	.....	.....	.....	4,000	.....	.....	.....
Richmond	.....	70,000	30,000	.....	.....	.....	.....	.....	.....	20,000	.....	.....	.....
Rushville	.....[1]	.....	.....	.....	.....	.....	.....	.....	2,000[2]	600	.....	.....	.....
Wabash	.....	25,000	4,000	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....
Iowa:													
Clinton	.....	42,000	15,840	.....	.....	.....	.....	.....	.....	80,000	.....	.....[7]	.....
Creston	.....	30,000	10,000	.....	.....	.....	.....	.....	.....	3,000	.....	.....[7]	.....
Fairfield	4,000	40,000	.....	.....	1,000	500	.....	.....	16,000[8]	70,000	.....	15,000	.....
Indianola	1,200	10,000	800	.....	.....	400	.....	10,200	.....	.....[1]	.....	.....	.....
Lake City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....[7]	.....	.....	.....

(For footnotes see page 23.)

TABLE No. 3—FORECAST OF WORK TO BE DONE IN 1912 *(Continued)*

Name of city.	Streets. Grading.	Streets. Pavements.	Streets. Sidewalks and curbs.	Streets. Other construction.	Water works. Mains, etc.	Water works. Meters.	Water works. Pumping plant.	Water works. Reservoirs.	Water works. Other construction.	Sewerage. Sewer system.	Sewerage. Plants. Pumping.	Sewerage. Plants. Treatment.	Other construction work.
Iowa (Continued).													
Marengo	500	.....	3,000	.....	500	.....	.....	.....	.....	.....	.....	.....	.....
Muscatine	5,000	50,000	15,000	.....	.....	.....	.....	.....	.....	10,000	.....	.....	12,000
Ottumwa	5,000	25,000	8,000	.....	15,000	.....	.....	.....	.....	30,000	.....	.....	25,000
Perry	.....	.....	.....	.....	4,500	.....	.....	.....	.....	3,500	.....	.....	.....
Sioux City	30,000	50,000	55,000	.....	.....	.....	.....	.....	25,000[2]	50,000	.....	.....	.....
Kansas:													
Belleville	500	.....	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beloit	.....	.....	2,000	.....	.....	.....	.....	.....	.....	600	.....	.....	.....
Coffeyville	8,000	.....[7]	30,000	.....	45,000	.....	12,000	30,000	.....	35,000	.....	.....[7]	.....
Emporia	5,000	75,000	18,000	.....	25,000	.....	.....	.....	.....	15,000	.....	.....	.....
Fort Scott	.....	100,000	.....	.....	.....	.....	.....	.....	.....	100,000	.....	.....	.....
Great Bend	15,000	.....	25,000	.....	.....	Private plant.			.....	10,000	1,500	.....	.....
Hutchinson	15,000	.....	25,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Independence	12,000	57,000	1,500	.....	32,000	.....	25,000	17,000	10,000[8]	10,000	.....	.....	.....
Manhattan	.....	75,000	.....	.....	7,000	200	.....[7]	.....	.....	.....	.....	.....	.....
Osawotomie	3,500	.....	1,000	.....	500	1,000	.....	.....	.....	.....	.....	.....	.....
Pittsburgh	.....	52,000	5,000	.....	35,000	.....	.....	.....	.....	2,500	.....	.....	.....
Salina	1,500	30,000	5,000	.....	.....	Private plant.			.....	2,500	.....	.....	.....
Topeka	20,000	120,000	40,000	.....	.....	.....	.....	.....	.....	150,000	50,000	150,000	150,000
Kentucky:													
Bellevile	5,000	5,000	3,000	.....	.....	.....	.....	.....	.....	6,000	.....	.....	.....
Louisville	.....	500,000	60,000	.....	.....	Private plant.			.....	200,000	.....	.....	.....
Ludlow	800	15,000	12,000	.....	.....	.....	.....	.....	.....	4,500	.....	.....	.....
Louisiana:													
Crowley	.....	40,000	25,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lake Charles	.....	250,000	15,000	.....	.....	.....	.....	.....	.....	80,000	.....	20,000	.....
Monroe	.....	.....	3,000	.....	15,000	.....	.....	.....	.....	20,000	.....	.....	.....
Maine:													
Pittsfield	300	.....	700	.....	500	.....	2,000	.....	.....	1,000	.....	.....	.....
Rockland	.....	10,000	2,000	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Saco	.....	4,000	.....	.....	.....	Private plant.			.....	.....	.....	.....	.....
Waterville	1,800	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland:													
Annapolis	200	3,000	.....	.....	.....	Private plant.			.....	.....	.....	.....	.....
Baltimore	.....	1,500,000	50,000	.....	100,000	.....	.....	.....	2,800,000[9]	4,000,000	.....	.....	.....
Easton	.....	60,000	5,000	.....	.....	.....	.....	.....	.....	8,000	.....	.....	.....
Westminster	1,000	2,500	700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts:													
Beverly	50,000	.....	15,000	.....	25,000	5,000	.....	.....	.....	100,000	.....	.....	.....
Cambridge	22,000	100,000	22,000	.....	20,000	5,000	.....	.....	.....	30,000	.....	.....	.....
Greenfield	.....	5,000	10,000	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Lowell	10,000	75,000	15,000	.....	25,000	1,000	.....	80,000	.....	70,000	.....	.....	18,000
Newton	1,000	30,000	20,000	.....	16,000	3,500	5,000	.....	.....	30,000	.....	.....	.....
Westfield	4,000	5,000	4,500	.....	2,500	500	.....	.....	.....	10,600	.....	.....	.....
Michigan:													
Ann Arbor	4,000	50,000	20,000	.....	.....	Private plant.			.....	4,200	.....	.....	.....
Cadillac	2,000	9,000	5,000	.....	.....	Private plant.			.....	8,000	.....	.....	.....
Escanaba	1,000	40,000	15,000	.....	.....	Private plant.			.....	.....[7]	.....	.....	.....
Grand Rapids	250,000[2]	.....	.....	.....	45,000	10,000	.....	.....	.....	200,000	.....	.....	.....
Kalamazoo	.....	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Saginaw	.....	100,000	.....	.....	.....	.....	.....	.....	.....	25,000	.....	.....	.....
Sault Ste. Marie	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Minnesota:													
Bemidji	2,000	10,000	10,000	.....	2,000	.....	.....	.....	.....	5,000	.....	.....	.....
Crookston	500	52,000	14,000	.....	2,000	500	Private plant.		.....	2,600	.....	.....	.....
Mankato	.....	25,000	5,000	.....	2,000	500	.....	.....	.....	7,000	.....	.....	.....
Minneapolis	150,000	600,000	200,000	.....	400,000	.....	.....	300,000	.....	600,000	.....	.....	.....
Montevideo	600	.....	1,200	.....	500	100	.....	.....	800	1,000	.....	.....	.....
Red Wing	2,000	.....	9,000	.....	10,000	700	.....	.....	.....	11,000	.....	.....	.....
South St. Paul	25,000	30,000	8,000	800	15,000	.....	.....	.....	.....	15,000	.....	.....	.....
Mississippi:													
Bay St. Louis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40,000[10]
Columbus	.....	5,000	.....	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Vicksburg	4,600	48,258	8,000	.....	6,138	.....	.....	.....	.....	2,000	.....	.....	.....
Missouri:													
Brookfield	2,000	50,000	10,000	.....	10,000	800	.....	.....	.....	.....	.....	.....	.....
Butler	.....	.....	.....	.....	.....	.....	.....	.....	2,000[2]	.....	.....	.....	.....
Carrolltown	2,000	50,000	5,000	.....	.....	Private plant.			.....	.....	.....	.....	.....
Columbia	.....	70,000	10,000	.....	.....	.....	.....	.....	.....	11,000	.....	.....[7]	.....
De Soto	.....	8,000	3,360	.....	600	.....	.....	.....	.....	30,000	.....	.....	1,200
El Dorado Springs	3,000	.....[7]	5,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Fulton	1,000	15,000	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hannibal	2,000	50,000	30,000	.....	.....[7]	.....	.....	.....	.....	80,000	.....	.....	.....
Independence	.....	60,000	30,000	.....	.....	Private plant.			.....	.....	12,000	.....	.....
Kansas City	250,000	480,000	150,000	.....	325,000	.....	150,000	.....	.....	750,000	.....	.....	.....
Kirksville	.....	18,000	1,500	.....	.....	.....	.....	.....	100,000[2]	.....	.....	.....	.....
Lexington	.....	18,000	2,000	.....	.....	Private plant.			.....	.....[7]	.....	.....	.....
Liberty	.....	25,000	3,000	.....	.....	.....	.....	8,000	.....	.....	.....	.....	.....
St. Charles	1,000	.....	10,000	.....	10,000	.....	.....	20,000	.....	.....	.....	.....	.....
Sedalia	5,000	42,525	10,000	.....	.....	Private plant.			.....	75,000	.....	17,000	.....
Montana:													
Bozeman	.....	.....	10,000	.....	1,500	300	.....	.....	.....	3,000	.....	6,000	.....
Great Falls	25,000	50,000	30,000	.....	50,000	1,000	.....	.....	.....	25,000	.....	.....	.....
Kalispel	.....	50,000	25,000	.....	30,000	.....	.....	.....	.....	20,000	.....	.....	.....
Missoula	10,000	210,000	35,000	.....	.....	Private plant.			.....	300,000	.....	.....	.....
Red Lodge	7,000	.....	.....	.....	2,500	.....	.....	.....	.....	5,000	.....	.....	.....
Nebraska:													
Blair	.....	.....	200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crete	1,000	.....	4,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Island	.....	15,000	6,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Holdrege	.....	.....	.....	.....	.....	.....	.....	.....	.....	800	.....	.....	.....
Norfolk	5,000	60,000	5,000	.....	10,000	500	20,000	.....	.....	5,000	.....	.....	.....
South Omaha	90,000	350,000	10,000	.....	.....	Private plant.			.....	60,000	.....	.....	.....
Tecumseh	1,000	.....	3,000	.....	10,000	1,000	2,500	4,500	.....	15,000	.....	.....	.....
New Hampshire:													
Laconia	3,000	12,000	3,000	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....
Portsmouth	50,000	50,000	5,000	.....	20,000	5,000	.....	.....	.....	3,000	.....	.....	.....
New Jersey:													
Bayonne	.....	130,000	5,000	.....	5,000	4,200	.....	.....	.....	5,000	.....	.....	.....
Bloomfield	10,000	200,000	10,000	.....	15,000	500	.....	.....	.....	20,000	.....	.....	.....

(For footnotes see page 28.)

TABLE No. 3—FORECAST OF WORK TO BE DONE IN 1912 *(Continued)*

Name of city.	Streets.				Water works.					Sewerage			
											Plants		
	Grading.	Pavements.	Sidewalks and curbs.	Other construction.	Mains, etc.	Meters.	Pumping plant.	Reservoirs.	Other construction.	Sewer system.	Pumping.	Treatment.	Other construction work.
New Jersey (Continued).													
Boonton	2,000	25,000	10,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dover	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....[7]	.....	.....	.....
East Orange	.....	.....	.....	.....	.....	.....	.....	.....	.....	100,000	.....	.....	.....
Elizabeth	.....	100,000	2,000	.....	.....	.....	.....	.....	.....	50,000	.....	.....	.....
Garfield	10,000	2,000	10,000	.....	2,000	1,000	.....	.....	.....	145,000	.....	.....	.....
Long Branch	1,000	90,000	5,000	.....	.....	Private plant.			.....	Private plant.			.....
New Brunswick	3,000	60,000	8,000	.....	9,000	2,000	.....	.....	.....	.....	.....	.....	[7] .....
Rahway	.....	25,000	.....	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....
New Mexico:													
Aubuquerque	.....	65,000	.....	.....	.....	Private plant.			.....	10,000	.....	.....	.....
New York:													
Batavia	.....	.....	5,000	.....	10,000	.....	.....	8,000	.....	75,000	.....	.....	.....
Binghamton	7,500	45,000	20,000	.....	.....	.....	.....	.....	.....	40,000	.....	.....	.....
Cohoes	.....	30,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cortland	1,000	10,000	4,000	.....	6,000	.....	.....	.....	.....	5,000	.....	.....	1,000
Dunkirk	.....	30,000	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hoosick Falls	.....	500	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hudson Falls	1,200	23,000	1,600	.....	.....	.....	.....	.....	175,000[2]	.....	.....	.....	.....
Jamestown	5,000	50,000	10,000	.....	23,000	10,000	1,000	50,000	.....	15,000	.....	.....	.....
Massena	5,000	4,000	3,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newark	4,000	.....	5,000	.....	.....	.....	.....	.....	.....	75,000	25,000	25,000	.....
Niagara Falls	500	100,000	5,000	.....	.....	.....	.....	.....	.....	100,000	.....	.....	40,000
Oneida	.....	15,000	1,500	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Poughkeepsie	10,000	150,000	25,000	.....	13,500	2,500	.....	.....	.....	25,000	.....	.....	.....
Salamanca	1,000	10,000	6,000	.....	1,000	.....	800	200	.....	1,000	.....	.....	.....
Watertown	.....	50,000	.....	.....	.....	.....	.....	30,000	.....	60,000	.....	.....	.....
White Plains	.....	25,000	15,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
North Carolina:													
Charlotte	.....	130,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goldsboro	....	1,000	1,000	.....	.....	.....	1,500	3,000	15,000	3,000	.....	.....	.....
Greensboro	8,000	4,000	6,000	.....	6,000	2,000	.....	.....	.....	1,000	.....	2,500	.....
Wilson	.....	10,000	.....	.....	1,500	500	.....	.....	.....	2,000	.....	.....	.....
North Dakota:													
Bismarck	10,000	.....	10,000	.....	3,000	.....	.....	.....	.....	1,000	.....	.....	.....
Dickinson	1,000	.....	5,000	.....	.....	400	1,800	.....	.....	.....	.....	.....	.....
Grand Forks	.....	40,000	5,000	.....	3,000	.....	.....	.....	.....	6,000	.....	.....	.....
Valley City	6,000	1,000	1,000	.....	5,000	500	.....	.....	.....	30,000	.....	.....	.....
Ohio:													
Ada	.....	7,500	1,000	.....	.....	Private plant.			.....	40,000	.....	.....	.....
Alliance	15,000	125,000	40,000	.....	7,500	750	1,000	100,000	.....	20,000	10,000	.....	.....
Bellefontaine	.....	.....	10,000	.....	.....	.....	.....	.....	.....	2,000	.....	8,000	.....
Bowling Green	1,000	9,000	3,000	.....	1,000	.....	.....	.....	.....	12,000	.....	.....	.....
Canton	30,000	550,000	160,000	.....	15,000	.....	30,000	.....	.....	29,000	.....	.....	.....
Circleville	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Cleveland	.....	1,217,000	60,000	.....	.....	.....	.....	.....	.....	1,000,000	.....	.....	.....
Dayton	10,000	800,000	20,000	.....	50,000	16,000	.....	.....	.....	175,000	.....	.....	.....
Delaware	1,500	50,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,000	.....
East Palestine	.....	25,000	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Findlay	.....	65,000	1,400	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....
Lorain	.....	50,000	7,000	.....	15,000	2,000	.....	.....	30,000	40,000	.....	.....	.....
Marion	1,600	22,000	8,000	.....	.....	Private plant.			.....	15,000	.....	.....	.....
Napoleon	300	2,000	600	.....	.....	.....	.....	.....	.....	14,000	.....	.....	.....
New Philadelphia	.....	.....	.....	.....	.....	.....	.....	.....	.....	100,000	.....	.....	.....
Niles	.....	75,000	5,000	.....	.....	5,000	.....	.....	.....	55,000	.....	.....	.....
Norwood	75,000	.....	2,013	.....	2,500	.....	.....	.....	.....	12,000	.....	.....	.....
Oberlin	.....	27,600	1,200	.....	.....	.....	4,000	.....	10,000[3]	2,000	.....	.....	.....
Pomeroy	.....	12,000	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ravenna	.....	7,000	1,000	.....	1,000	.....	.....[7]	.....	.....	1,000	.....	.....	.....
Springfield	12,000	74,000	20,000	.....	20,000	2,000	.....	10,000	.....	120,000	.....	.....	14,000
Warren	.....	30,000	.....	.....	.....	Private plant.			.....	10,000	15,000	35,000	10,000
Oklahoma:													
Altus	1,000	100,000	2,000	6,000	1,000	.....	.....	.....	.....	10,000	.....	.....	.....
Bartlesville	.....	177,900	.....	.....	.....	Private plant.			.....	55,000	3,000	.....	.....
Durant	.....	50,000	10,000	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
El Reno	.....	80,000	10,000	.....	.....	.....	35,000	.....	.....	20,000	.....	.....	.....
Miami	.....	.....	4,000	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Muskogee	50,000	500,000	50,000	.....	25,000	25,000	100,000	75,000	.....	100,000	.....	.....	.....
Oklahoma City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,000	.....
Okmulgee	15,000	100,000	50,000	.....	.....	2,000	.....	10,000	.....	20,000	.....	15,000	.....
Paul's Valley	.....	.....	2,000	.....	5,000	1,000	.....	.....	.....	.....	.....	.....	5,000
Pawhuska	.....	60,000	2,000	.....	60,000[2]	.....	.....	.....	.....	20,000	.....	.....	.....
Sulphur	.....	.....	1,000	.....	.....	.....	.....	.....	.....	20,000	.....	.....	.....
Tulsa	16,000	375,000	15,000	.....	25,000	15,000	.....	.....	.....	175,000	.....	.....	.....
Wagoner	.....	.....	.....	200,000[2]	.....	.....	.....	.....	20,000[2]	.....	.....	.....	20,000
Oregon:													
Baker	.....	73,200	35,000	.....	4,500	2,000	.....	.....	.....	27,000	.....	15,000	.....
Grants Pass	15,000	134,700	11,000	.....	.....	Private plant.			.....	168,000	.....	.....	.....
Cranston	.....	33,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McMinnville	.....	150,000	15,000	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Oregon City	5,000	12,000	15,000	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
Portland	3,000,000[2]	.....	.....	.....	700,000	20,000	.....	.....	20,000	1,500,000	.....	.....	.....
The Dalles	7,000	.....	5,000	.....	.....	.....	.....	.....	.....	....	.....	.....	.....
Pennsylvania:													
Athens	.....[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....[2]	.....	.....	.....
Beaver Falls	5,000	10,000	5,000	.....	.....	Private plant.			.....	110,000	.....	65,000	.....
Bethlehem	2,000	7,000	.....	.....	2,500	.....	2,000	.....	.....	.....	.....	.....	.....
Carlisle	2,000	8,000	.....	.....	.....	.....	.....	.....	.....	65,000	.....	35,000	.....
Franklin	500	80,000	3,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gallitzin	.....[1]	.....	.....	.....	.....[1]	.....	.....	.....	.....	3,500	.....	.....	.....
Girardville	.....	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harrisburg	.....	200,000	70,000	.....	5,000[2]	.....	.....	.....	.....	100,000	.....	.....	.....
Hollidaysburg	2,000	2,500	4,000	.....	.....	.....	.....	.....	.....	1,000	.....	.....	.....
Homestead	1,500	3,500	800	.....	.....	.....	.....	.....	.....	4,500	.....	.....	.....
Indiana	600	9,000	2,000	.....	.....	.....	.....	.....	.....	4,000	.....	.....	.....
McKeesport	.....	85,000	5,000	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Meadville	.....	5,000	400	.....	.....	.....	.....	.....	.....	18,000	27,500	36,800	6,000
Norristown	10,000	20,000	1,500	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....
Oil City	14,000	52,000	22,000	2,000	8,000	.....	1,000	.....	.....	6,000	.....	.....	5,000[12]
Sharpsville	.....	13,500	2,000	.....	.....	.....	.....	.....	.....	2,500	.....	40,000	.....
South Bethlehem	2,000	30,000	.....	.....	.....	Private plant.			.....	5,000	.....	100,000	.....
Warren	.....	15,000	2,000	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Williamsport	3,500	.....	2,500	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Rhode Island:													
Cranston	.....	33,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woonsocket	.....	.....	5,000	.....	.....	.....	.....	.....	.....	5,000	.....	.....	.....

(For footnotes see page 23.)

TABLE No. 3—FORECAST OF WORK TO BE DONE IN 1912 *(Continued)*

Name of city.	Streets. Grading.	Streets. Pavements.	Streets. Sidewalks and curbs.	Streets. Other construction.	Water works. Mains, etc.	Water works. Meters.	Water works. Pumping plant.	Water works. Reservoirs.	Water works. Other construction.	Sewerage. Sewer system.	Sewerage. Plants. Pumping.	Sewerage. Plants. Treatment.	Other construction work.
South Carolina:													
Columbia	.....	.....	.....	163,000[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orangeburg	3,000	15,000	2,000	.....	2,000	.....	.....	.....	.....	2,000	.....	.....	.....
South Dakota:													
Aberdeen	.....	.....[7]	20,000	.....	13,000	.....[7]	25,000	.....	.....	130,000[11]	.....	.....	.....
Huron	2,000	1,000	.....	.....	3,000	15,000	.....	.....	.....	.....	.....	.....	.....
Mitchell	4,000	.....	3,500	.....	4,800	1,500	.....	.....	5,000	2,000	.....	2,500	.....
Rapid City	.....[7]	6,000	6,000	.....	10,000	1,000	.....	.....	.....	.....	.....	.....	.....
Yankton	1,000	.....[7]	2,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,500
Tennessee:													
Johnson City	7,500	90,000	13,000	.....	150,000	.....	.....	.....	.....	4,000	.....	.....	.....
Texas:													
Bryan	.....	.....	6,000	.....	10,000	1,000	.....	.....	.....	15,000	.....	1,000	.....
Denison	6,000	50,000	15,000	.....	.....	1,200	.....	.....	.....	.....	.....	.....	.....
El Paso	35,000	170,937	.....	.....	75,000	.....	20,000	.....	.....	35,000	.....	20,000	30,000
Ennis	7,500	5,000	8,500	.....	10,000	4,500	.....	.....	.....	12,500	.....	4,000	.....
Mineral Wells	.....	.....	2,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paris	.....	200,000	25,000	.....	3,000	1,000	3,000	25,000	.....	25,000	.....	.....	.....
San Antonio	120,000	80,000	40,000	.....	.....	.....	.....	.....	.....	50,000	.....	.....	.....
Utah:													
Ogden	.....	70,000	40,000	.....	80,000	.....	.....	450,000	.....	15,000	.....	.....	.....
Virginia:													
Newport News	2,000	3,000	2,500	.....	.....								
Suffolk	2,500	10,000	2,000	.....	.....	.....	.....	.....	.....	1,000	.....	.....	.....
Washington:						Private plant.			.....	1,000	.....	.....	3,500
Aberdeen	180,000	180,000	25,000	.....	10,000								
Bellingham	20,000	95,000	25,000	.....	.....	500	2,500	6,000	.....	60,000	.....	.....	.....
Hoquiam	20,000	80,000	33,000	.....	.....	.....	.....	.....	.....	25,000	.....	.....	.....
North Yakima	40,000	150,000	15,000	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....
Port Angeles	50,000	.....	.....	.....	.....	Private plant.			.....	300,000	.....	.....	.....
Port Townsend	11,000	.....	9,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle	1,825,440[14]	585,377	.....	.....	192,300	.....	.....	172,818	.....	2,051,813	.....	.....	127,221
Vancouver	50,000	150,000	.....	.....	20,000	.....	5,000	.....	.....	100,000	.....	.....	.....
West Virginia:													
Charleston	.....	.....	190,000	80,000	.....	May purchase private plant.			.....	20,000	.....	.....	.....
Moundsville	.....	.....	.....[7]	.....[7]	.....	.....	.....	.....	.....	70,000	.....	.....	.....
Wisconsin:													
Antigo	600	2,400	3,600	.....	2,500	.....	.....	.....	.....	.....	.....	40,000	.....
Appleton	.....	50,000	14,000	.....	.....[7]	.....	.....	.....	.....	95,000	.....	.....	.....
Baraboo	4,000	6,000	7,000	.....	2,500	200	10,000	.....	.....	2,500	.....	.....	.....
Beloit	.....	15,000	.....	.....	.....	.....	.....	.....	.....	5,000	.....	2,000	.....
Burlington	300	5,500	1,200	.....	5,000	250	1,000	300	.....	3,000	.....	.....	.....
Chippewa Falls	.....	18,000	.....	.....	3,000	.....	.....	.....	.....	20,000	.....	.....	.....
Fond du Lac	.....	13,000	20,000	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....
Fort Atkinson	3,000	12,000	1,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Bay	.....	130,000	30,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Janesville	.....	15,000	10,000	.....	.....	.....	.....	.....	.....	.....[7]	.....	.....	.....
Kenosha	12,000	60,000	24,000	.....	.....	.....	.....	.....	60,000[8]	35,000	.....	.....	.....
La Crosse	.....	.....	.....	.....	260,000	.....	.....	.....	.....	100,000	.....	.....	.....
Manitowoc	15,000	50,000	10,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....
Marinette	.....	12,000	5,000	.....	.....	.....	.....	.....	.....	12,000	.....	.....	5,000
Superior	5,000	150,000	50,000	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
Two Rivers	.....	32,000	.....	.....	.....	.....	.....	.....	.....	4,500	.....	.....	.....
Waukesha	4,000	25,000	16,000	.....	2,000	.....	.....	.....	.....	8,000	.....	.....	.....

[1] Nothing contemplated under this general head.
[2] Includes all work under this general head.
[3] Reinforced concrete culverts.
[4] Reclaiming water front.
[5] Gas plant $55,000, park improvement $15,000.
[6] Fourteen blocks of asphalt and 20 blocks of brick.
[7] Construction probable; cost unknown.
[8] Filter plant.
[9] $2,000,000 for filter, $800,000 for a dam.
[10] Rebuilding sea wall.
[11] Includes treatment plant.
[12] Includes curbing.
[13] Garbage furnace.
[14] Includes sidewalks and curbs.

TABLE No. 4

FORECAST OF PURCHASES OF APPARATUS

Name of city.	For street work. Rollers, graders, scrapers, plows, etc.	For street work. Other kinds.	For street cleaning. Carts, flushers, brooms, sprinklers, etc.	Other apparatus.
Alabama:				
Montgomery	$2,000	.....	$1,000	.....
Arkansas:				
Helena	250	.....	500	.....
Pine Bluff	2,500	.....	500	.....
California:				
Fresno	2,000	.....	.....	.....
Modesto	4,500	.....	3,000	.....
Santa Monica	1,500	.....	1,000	.....
Visalia	9,000	.....	2,000	.....
Colorado:				
Colorado Springs	1,000	.....	1,400	.....
Longmont	3,000	.....	200	.....
Connecticut:				
Derby	200	.....	.....	.....
Norwich	.....	.....	10,000	.....
Georgia:				
Columbus	.....	.....	800	.....
Macon	150	.....	.....	.....
Waycross	.....	.....	15,000	.....
Illinois:				
Carlinville	300	.....	100	.....
Harvey	500	.....	.....	.....
Oak Park	500	.....	200	.....
Waukegan	.....	500[2]	.....	.....
Indiana:				
Crawfordsville	200	.....	200	.....
Huntington	.....	.....	1,000	.....
Portland	.....	.....	200	.....
Richmond	.....	.....	1,500	.....

Name of city.	For street work. Rollers, graders, scrapers, plows, etc.	For street work. Other kinds.	For street cleaning. Carts, flushers, brooms, sprinklers, etc.	Other apparatus.
Iowa:				
Indianola	.....	.....	250	.....
Muscatine	.....	.....	2,000	.....
Sioux City	.....	.....	.....	7,500[3]
Kansas:				
Coffeyville	.....	.....	1,000	.....
Great Bend	500	.....	.....	.....
Hutchinson	1,000	.....	.....	.....
Salina	1,000	.....	500	.....
Louisiana:				
Lake Charles	1,000	.....	.....	.....
Maine:				
Pittsfield	100	.....	.....	.....
Massachusetts:				
Cambridge	500	.....	500	.....
Newton	2,000	.....	1,000	.....
Westfield	.....	500	.....	.....
Minnesota:				
Bemidji	.....	.....	2,500	.....
Crookston	.....	.....	1,000	.....
Montevideo	200	.....	.....	.....
Mississippi:				
Columbus	2,000	.....	.....	.....
Vicksburg	2,000	.....	2,600	.....
Missouri:				
Carrollton	.....	.....	100	.....
Fulton	.....	.....	300	.....
Honnical	.....	.....	500	.....
Kansas City	25,000	.....	12,000	.....

TABLE NO. 4.—FORECAST OF PURCHASES *(Continued).*

Name of city.	For street work: Rollers, graders, scrapers, plows, etc.	For street work: Other kinds.	For street cleaning. Carts, flushers, brooms, sprinklers, etc.	Other apparatus.
Missouri:				
Kirksville	.....	.....	2,300	.....
Liberty	.....	.....	1,000	.....
St. Charles	250	.....	.....	.....
Sedalia	500	.....	.....	.....
Montana:				
Red Lodge	1,000	.....	500	.....
Nebraska:				
Tecumseh	500	.....	.....	.....
New Hampshire:				
Laconia	500	.....	300	.....
Portsmouth	1,000	.....	500	.....
New Jersey:				
Bloomfield	3,000	.....	.....	.....
Boonton	.....	.....	1,500	.....
New York:				
Binghamton	52,650	.....	.....	.....
Cortland	1,000	.....	.....	.....
Jamestown	500	.....	500	.....
Salamanca	100	.....	100	.....
North Carolina:				
Brantford	1,000	.....	1,000	.....
Greensboro	1,000	.....	1,000	.....
North Dakota:				
Bismarck	500	.....	.....	.....
Dickinson	500	.....	.....	.....
Ohio:				
Canton	2,500	.....	.....	.....
Delaware	200	.....	750	.....
Oberlin	.....	.....	250	.....
Warren	200	.....	100	.....
Oklahoma:				
Altus	.....	.....	500	.....
Okmulgee	1,000	.....	500	.....
Pauls Valley	800	.....	800	.....
Oregon:				
Baker	400	.....	1,500	.....
Pennsylvania:				
Athens	.....	.....	500	.....
Beaver Falls	.....	.....	200	.....
Bethlehem	.....	.....	750	.....
Franklin	100	.....	100	.....
Harrisburg	.....	.....	1,000	.....
Meadville	500	.....	300	.....
Oil City	.....	.....	.....	.....[4]
Rhode Island:				
Cranston	2,600	.....	.....	.....
South Dakota:				
Huron	500	.....	.....	.....
Mitchell	150	.....	125	.....
Rapid City	3,000	.....	.....	.....
Texas:				
Bryan	500	.....	200	.....
Ennis	3,500	.....	.....	.....
Paris	500	.....	.....	.....
Virginia:				
Newport News	300	.....	.....	.....
Suffolk	2,000	.....	.....	.....
Washington:				
Aberdeen	.....	.....	1,500	.....
N. Yakima	.....	.....	2,500	.....
Port Angeles	3,000	.....	.....	.....
Vancouver	2,000	.....	2,000	.....
West Virginia:				
Charleston	.....	.....	2,000	.....
Wisconsin:				
Appleton	2,000	.....	2,000	.....
Burlington	200	.....	.....	.....
Chippewa Falls	.....	.....	600	.....
Fond du Lac	.....	.....	.....	1,000[3]

[1]No purchases contemplated.
[2]Concrete mixer.
[3]Includes all kinds.
[4]Brick rattler.

CRIMINAL IDENTIFICATION IN OKLAHOMA

In Oklahoma City, Okla., which is now under Commission form of Government, Commissioner Grant, of the Department of Public Affairs, has just closed a contract for the installation of two sections in addition to the already large equipment of the Bureau of Criminal Identification. The resignation of the former superintendent of that division, Harry E. Stege, somewhat delayed the proper installation of these two sections, but Assistant Superintendent A. A. Gordon, who was placed in charge, and who is one of the most competent criminologists in the entire West, has now completed all the details.

The full equipment, which is now in charge of Superintendent Gordon, consists not only of a full six-section bureau of indentification system, but has also a complete finger print set, which has also been expanded until it is second to none in the entire West.

This city has just completed and moved into a new three-story brick jail building, erected at a cost of $57,000.

STREET MAINTENANCE IN NEWARK

Newark, N. J., during the year 1910 spent $347,989 for street cleaning and repairs, this including stable charges and all other items of operating cost, but not interest, depreciation or other fixed charges. These items are divided into street cleaning, street repairs, city stables and miscellaneous. For street cleaning the disbursements were: Bills and claims, $17,625.61; weekly payrolls, $218,254.09; monthly payrolls, $8,616.01. For street repairs: Bills and claims, $27,243.49; weekly payrolls, $30,851.83; monthly payrolls, $4,842.50. City stables: Bills and claims, $11,150.33; weekly payrolls, $16,619.58. Miscellaneous: Bills and claims, $3,554.64; weekly payrolls, $7,195.18; monthly payrolls, $2,035.96. The totals were: Street cleaning, $244,495.71; street repairs, $62,937.82; city stables, $27,769.91; miscellaneous, $12,785.78.

The work done under the head of cleaning was:

	Cubic yards.	Miles.
Cleaning Pavements by Machine	28,015	3,756.59
" Block Pavement by Hand	31,102	3,096.82
" Telford Pavement by Hand	3,115	462.08
" Cobble Pavement by Hand	1,510	76.69
" Asphalt Pavement by Hand	23,573	8,475.05
" Brick Pavement by Hand	11,131	2,406.21
" Wood Pavement by Hand	119	23.50
" Bitulithic Pavement by Hand	4,915	1,152.54
Flushing Streets		608.15
Cleaning by Squeegees		232.03
Cleaning Gutters and Spots	1,072	
Cleaning Intersections, Details	5,202	
Picking Papers (7,953 bags).		
Removal of Snow	92,824	
Total approximate square yards	428,517,619	

The items of street repairs were numerous, including, besides actual repairs, removing trees, setting up street signs, cutting weeds, building fence, etc. Repairing cobble pavements in 22 places cost $261.41; repairing brick pavements in 200 places, $1,266.65; repairing stone block pavements in 1,079 places, $9,817.99. Twenty-two thousand one hundred and thirty-three dollars and ninety-five cents was spent in repairing and oiling telford streets.

Unit costs of work done were purposely omitted, because "it has been somewhat difficult to find a system of keeping the accurate cost of street cleaning, and very few cities in the United States have adopted a comprehensive system, nor can the reports of the various cities be intelligently compared, owing to the lack of uniformity of system in their reports." An effort is being made to develop a system of recording and classifying the items which will make it possible to present cost data which will mean something.

Certain general cost items are given which are of some interest, however. Of the asphalt pavements, 5,891.79 square yards were repaired as general maintenance and 1,124.66 square yards replaced over cuts, at a total cost of $3,060.83 for materials, $1,509.40 for stables and $5,833.35 for labor. By contract 28,245 square yards of asphalt and 66.73 cubic yards of concrete were placed as repairs on 34 streets, at a cost of $1.23 per square yard for surfacing, $6 per cubic yard for binder and $5 per cubic yard for concrete.

Something over 28,000 square yards of asphalt pavements were resurfaced by contract at $1.23 per square yard.

At the end of the year there were in the city 61.7 miles of granite block, 51.4 of sheet asphalt, 38.5 of brick, 30.9 of telford, 11.5 of Belgian block, 8.9 of bitulithic, 4.0 of cobble, 0.9 of bituminous concrete, 0.5 of wood block, 0.17 of Medina sandstone, 0.12 of bituminous macadam and 0.10 of asphalt block. The telford was decreased by 1.5 miles, the cobble by 0.7 miles; while the others were increased by a total of 9.8 miles, of which 4.6 miles were brick and 4.2 miles granite block.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance

ROADS AND PAVEMENTS

Troup County Will Build Good Roads

LaGrange, Ga.—County Commissioners of Roads and Revenues report that since the $200,000 bond issue for good roads had been passed by the people a total of about 100 miles of good roads had been completed under their supervision and that 50 more miles of road had been contracted for. This work is being done by county convicts and contractors together, and has proven highly satisfactory so far. Most of the main roads of the county have been completely rehabilitated and every section of Troup county is now easily accessible at all times of the year. The LaGrange Banking & Trust Company has been designated the depository for the sinking fund to redeem the road bonds.

Officials Inspect New Boulevard

Livermore, Cal.—Supervisors, county officials and interested citizens met in Niles Canyon for an inspection of the first permanent piece of work on the new scenic boulevard through Niles Canyon. A luncheon was served under the big trees after the inspection was finished. A section of the retaining wall a mile west of Brightside has been completed. It is constructed of concrete, is 700 feet long, is an average of 20 feet above the creek bed and rests on bedrock. The boulevard above the wall will be protected from washouts by it. The road at this spot has been carried away every year. The contract was completed by Peter Oxsen & Co. at a cost of $6,000. It was pronounced an excellent piece of construction by the supervisors and County Surveyor P. A. Haviland.

Famous Boulevard Paving Almost Completed

Pasadena, Cal.—The completion of South Orange Grove avenue paving, which is now practically accomplished, gives Pasadena one of the most magnificent avenues in the world. Even before $85,000 was spent on the bitulithic, Orange Grove avenue was considered as fine an avenue as there is in the West. When all the wires are put underground, when the parkings are all in lawn and the bronze electroliers are in place, Orange Grove avenue will be second to none in the country, it is said. The total cost of the improvements on a section of barely more than one-half mile in length is close to $150,000, for most of which the residents along Orange Grove avenue, from Colorado street to California street, have been assessed. In addition to the $85,000 for the bitulithic, there has been paid $45,000 for the underground conduits to carry electric light and telephone lines below the surface. Over $700 will be the cost of planting the parking to grass.

County Engineer Reports on Roads

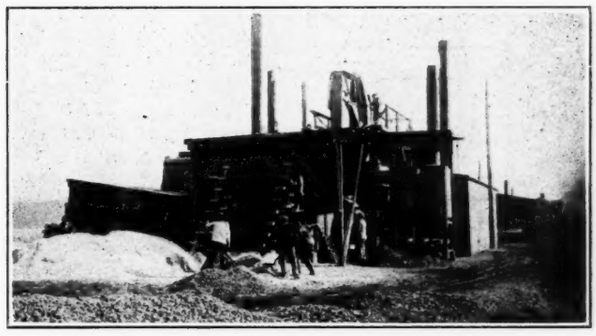
Utica, N. Y.—The following annual report of County Engineer Paul Schultze gives an account of the road work in Oneida county. Miles town macadam built during the year, 5.68; average width of metal, 10.5 feet; average depth of metal, 8 inches; average cost per mile, $1,966; total miles town macadam, 9.48; miles resurfaced with crushed stone, 17.73; average cost per mile, $1,169.60; total miles resurfaced with crushed stone, 67.66; miles new gravel road built during the year, 2; average width metal, 8 feet, 7 inches; average depth metal, 9 inches; average cost per mile, $355; miles resurfaced with gravel, 21.87; average cost per mile, $405.38; total miles gravel road in towns, 278.89; total miles resurfaced with other material, 4.39; average cost per mile, $1,041; miles shaped and crowned during year, 392.75; total miles regularly honed, 213; concrete culverts under 5 feet built, 53; average cost, $61.13; cast iron or steel culverts placed, 174; average cost, $31.29; concrete bridges built, 15; average cost, $197.83; other bridges built, 12; total number of bridges in towns, 821; bridges between 20 and 50 feet built, 13; total number bridges in towns between 20 and 50 feet, 239; bridges over 50 feet built, 2; total number bridges over 50 feet, 103; total mileage, all roads, 2,309.91.

Spend Million in Street Improvements

Akron, O.—It has been estimated that legislation was passed during the past year by the outgoing administration for the paving of streets and building of sewers to the extent of over a million dollars. Much of the work has been done, but a lot of it yet remains for the new administration.

Wilmington Operates Two Paving Plants

Wilmington, Del.—The Street and Sewer Department of Wilmington, has been operating two paving plants during the past season. The first a stationary plant, was used in laying a bitulithic surface on Market street, the foundation being grouted concrete or Wilmington foundation. On Union street a surface of Bermudez asphalt was laid on the same kind of foundation. The Union street surface was prepared with a Smith hot mixer, a small portable machine, originally bought for repair work, but which answered the purpose very well for surfacing this street.



Courtesy Wilmington *Star*.

STATIONARY ASPHALT PLANT.

Courtesy Wilmington *Star*.

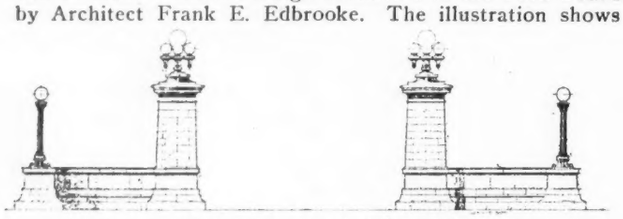
HEATED CONCRETE MIXER USED FOR BITUMINOUS PAVING.

Inspecting Pavements in Council Bluffs

Council Bluffs, Ia.—Six city officials and a committee of three from the Citizens' Association of Webster City, Ia., stopped for two hours to "do" Council Bluffs last week. The delegation is visiting the principal cities of western Iowa to ascertain which kind of paving would be best for their city. The party included John Essig, city engineer; Councilmen B. F. Payne, Welden Helmik, Ed. Garth, O. N. Ross and W. L. Whitam, and J. W. Young, S. S. Parkhurst and C. H. Clifton of the Citizens' Association. Webster City is to have twenty blocks of new paving next summer. Although the sentiment is in favor of concrete paving, the city officials are loath to employ that material until they have seen it successfully used. The delegation has inspected some concrete pavement at Sioux City, but the pavement was new and no information as to how it would wear was gained.

Design of Denver's New Park Gateway

Denver, Colo.—The ornamental gateway to be erected at the entrance to City Park, facing Seventeenth avenue, will be made from the design submitted to the Park Board by Architect Frank E. Edbrooke. The illustration shows



APPROVED DESIGN OF CITY PARK GATEWAY, DENVER.

the design selected from a list of thirty-one drawings, submitted by the architects of Denver. The gateway will cost $5,000, less the architect's fee of $250. The structure will be about 80 feet wide, with a 30-foot gateway opening. The donor, whose name will not be given out until the improvement is completed, has requested that all Colorado material be used in construction.

Work for Good Roads

Asheville, N. C.—There is concerted interest and action in the good roads movement in the mountains of western North Carolina. Macadam and sand-clay roads have been and are now being actively constructed throughout the entire "Land of the Sky" region in western North Carolina, there already being hundreds of miles of splendid hard surfaced roads winding about the mountains, across hills and valleys from one section and town to another. Asheville is the center of this good roads movement, from which traverse a network of good roads all over Buncombe and adjoining counties. The first good roads association in the entire South, the Asheville and Buncombe County Good Roads Association, was established in Asheville in 1899, at which time there were practically no improved roads in the county outside of the city of Asheville and the Vanderbilt estate. Immediately after organizing this association raised $5,000 by subscription and regraded and macadamized the road from Asheville to Biltmore and stimulated further effort. Since the county has built about 100 miles of macadam and sand-clay roads; grades have been changed; whole roads relocated; Asheville has more than twice doubled its pavement, having now nearly 40 miles; the county now operates three rock crusher plants and has full equipment for road building at each plant.

New Traffic Law in Force

Muncie, Ind.—Hereafter all drivers of vehicles and the like had better keep an open eye for the police officers, for if they should happen to stop their vehicle with the left side to the curb or drive on the left side of the street they stand a chance of being arrested, as Muncie's new traffic ordinance is now in full force and effect. The traffic ordinance, which became effective last week, when the signature of Mayor Tuhey was attached and publication was made according to law, regulates the traffic of all vehicles of every kind and description excepting trains, street cars and baby carriages. Mayor Tuhey has instructed the department to see that the new ordinance is enforced and the police will not hesitate to arrest those who persist in violating the new city law. The police in Muncie have experienced considerable trouble because of the absence of a traffic ordinance and now that one has been adopted by the council they intend seeing that it is enforced. All violations of the ordinance are punishable with a fine of not less than $5 nor more than $25 for each offense. Through the adoption of the new ordinance the city officials hope to do away with much of the blockading of the streets by rigs and other vehicles. In the past the drivers of vehicles have paid little attention to the traffic laws and have stopped their vehicles on either side of the street and allowed them to remain there as long as they desired. However, under the new ordinance all vehicles must keep to the right and no vehicles shall be allowed to stop with the left side to the curb. The police are permitted to determine how long a vehicle should be allowed to remain in one place at any one time. There are cases wherein young farmers drive to the city and allow their horses to stand in the streets for four or five hours at a time and an effort will be made to stop such practice.

SEWERAGE AND SANITATION

Board of Health to Placard City

Alameda, Cal.—The city of Alameda is about to employ a unique plan to raise the standard of cleanliness in residences and business houses. In future the sanitary condition of the various premises is to be shown by placards bearing the inscriptions "clean," "dirty" or "filthy." Those places which do not satisfy the Board of Health will be placated as dirty or filthy until they comply with the demands of the authorities. This action was decided upon at the last meeting of the Board of Health, which appointed a committee to post the placards and to care for the general health of the city. The Board of Health intends to inspect not only the business houses, but also the private residences of the city and to affix the placards to every house in the city. Those residences which can be designated as "clean" will not be placarded, but those in which sanitary conditions are disregarded will be designated as "dirty" or "filthy" until the house owners remedy the conditions, upon which the placards will be removed. As the Board of Health has arbitrary powers under the city charter, the placards must remain on the houses or places of business until the Board is satisfied that the conditions therein are sanitary. If any householder tears down the placards, the extreme penalty of the law can be enforced. This action was deemed necessary by the Board on account of the many complaints received.

By Close Vote Drink Cup Law Passes

Atlanta, Ga.—The anti-public drinking cup ordinance has passed the City Council by the close margin of one vote. The roll call showed 14 for it and 13 against it. The ordinance is modeled after similar ones in force in other cities, and makes the public drinking cup taboo in practically every public place in Atlanta, only churches and Sunday-schools being excepted. The ordinance originated in the Board of Health and came to the Council with the unanimous approval of that body. In its original form, however, the ordinance was somewhat drastic, and the Council sent it to the Ordinance Committee to be toned down.

New Ordinance Puts Ban on Roller Towel

Detroit, Mich.—"No person, firm or corporation owning, in charge of or in control of any public lavatory, toilet room or wash room shall maintain in or about such place any roller towel or towel for common use. The term 'common use' as used in this ordinance shall be construed to mean for use by more than one person."

This is the essential part of an ordinance drafted by Assistant Corporation Counsel Walter Barlow for Health Officer Guy L. Kiefer to put a stop to the use of roller towels in public places. The ordinance makes the offense punishable by a fine of from $5 to $100 and it is to be introduced in the council and a strong effort made to have it adopted and given immmediate effect.

Officials Study Sewerage Problem

Bloomfield, N. J.—Under the authority of their respective town councils, representatives of Bloomfield and Glen Ridge visited the Passaic Valley Sewerage Commissioners to ascertain under just what conditions these two municipalities may now enter into the trunk sewer project. It was explained that as things stand the Commission has no power to either keep them out of the project or to put them in. That is a matter that rests with the fifteen municipalities that have signed the contract for the work. In view of that fact it was suggested that Bloomfield and Glen Ridge confer with Orange about the matter.

Smoke Inspector Submits Report

Lowell, Mass.—Smoke Inspector John Hollowood has just completed a report having to do with his department, and it is quite an interesting report. He calls attention to the fact that the object of the smoke abatement regulations is not to harass manufacturers or impede industrial progress, but to limit the output of smoke to the lowest possible extent. The following records show the activity of the smoke inspection office and the desire on the part of the public for relief from this nuisance: Total observations made, 708; verbal complaints received, 830; written complaints received, 86; complaints, formal petitions, 10; total, 926. Written notices sent out, 200; replies received, 51.

City Discusses Sewage Disposal

Dallas, Tex.—Sewage disposal by the Cameron septic tankage system was presented to the Board of Municipal Commissioners by F. H. Lancashire, engineer and contractor. Mr. Lancashire has been a resident in Dallas for a number of years and has been engaged in engineering and contracting work here. Mr. Lancashire's principal recommendation was that the city shall acquire a considerable amount of land below town upon which the liquid from the tanks shall be allowed to go as a sort of irrigation and fertilizing agent. Fine crops of corn and vegetables, he said, can be grown. If the city is not desirous of cultivating or directing the cultivation, he said, lands may be secured over which the owners are willing to allow the city to spread the irrigating agent. As the other alternative, he said, smaller acreage will be needed and filter beds may be constructed for the purification of the liquid, from which all solid matter is removed. In either case, he said, there will be need for a great trunk line to carry the sewage far below the city.

Health Board Seeks Remedy for Unsanitary Bread Boxes

Indianapolis, Ind.—Unsanitary bread boxes were discussed at a recent meeting of the city board of health. The board for some time has endeavored to clean up the bread box situation, but thus far no satisfactory solution has been found. One of the principal difficulties has been that grocers and others have insisted on sweeping out their bread boxes with the same brooms they use for sweeping floors and sidewalks. The board placed the situation in the hands of Dr. C. S. Woods, city sanitarian, for such action as Dr. Woods may deem advisable. The question of whether or not bakeries shall be permitted in basements was also discussed, and this question was left with Dr. Woods. Mayor Shank attended the meeting and approved of the plan to clean up the bread boxes.

Recommends Milk Farm for City Colony

Cleveland, O.—The establishment of a milk farm at Warrensville as a part of the city farm colony activities for the purpose of supplying the babies' dispensaries, infant asylums and municipal institutions with milk is urged by Dr. H. J. Gerstenberger, director of the city department of child hygiene, in a report submitted to the Board of Health. Dr. Gerstenberger states that forty dispensaries would be needed to cover the entire city, but urges the immediate establishment of seventeen additional dispensaries. There are twelve in service now, and of these ten are operated by the Board of Health. The milk farm plan suggested by him is followed in Berlin. In the opinion of Dr. Gerstenberger, Cleveland should undertake the same work at the Warrensville farm.

WATER SUPPLY

Test High Pressure Mains

Toledo, O.—In making a test of the high pressure water system with the use of electricity from the Todelo Railways & Light Co., Tyler Green, superintendent of fire alarm and telegraph, learned that 70 amperes of electricity returned to the power plant through the pipes. At this rate, Green said, the pipe would be destroyed in six months. In order to prevent this damage a cable will be inserted to carry back the current.

City Water Saved Through New Plan

South Bend, Ind.—Practically a quarter of a million gallon is the saving in city water during 1911, the decrease being due principally to a new plan in the department, which caused the installation of meters in public buildings. During the 12 month period, a total of 1,497,283,665 gallons of water were pumped. It required 3,150 tons of coal to do the work, a little less than five tons of the total quantity burned in 1910. The report of Supt. Thomas Ayres, which has just been completed by Charles Creviston, clerk of the department, shows that 653 service connections were installed during the year and 320 meters. One mile and 2,760 feet of pipe was laid in River Fork during the year, while in the section of South Bend separate from the newly annexed territory there were three miles and 3,810 feet of mains placed in position. A total of 33 fire hydrants were installed in the 12 months.

City's Water Works Make Great Gains

Atlanta, Ga.—In a statement furnished to the Mayor for use in his annual message to City Council, General Manager Zode Smith, of the Atlanta water works, has given, in a comprehensive and brief form, the most important details of what the department has done in the year 1911. The new reservoir has been completed and all the pipes, valves, intakes, etc., leading into and out of the same have been connected, and the reservoir is now full of water. This was bond issue work, the total expenditure being $41,898. The new coagulating basins have been completed and are now connected with the purification system and have been in use some time. The total cost of this work under the bond issue was $52,479. The 10,000,000 gallons addition to the filter plant has been completed and the filters have been in operation several months. The total expenditure under the bond issue for this work to date is $40,193. The above work has enlarged the capacity of the water works system to the extent that the city now has a storage capacity of 400,000,000 gallons, and a filtration system that will supply for several years an ample quantity of pure and wholesome water.

Committee Advise Continued Use of Chlorine

Cleveland, O.—A joint committee, composed of representatives of the Cleveland section of the American Chemical Society, the Cleveland Enginering Society and the Cleveland Academy of Medicine, forwarded a resolution to the special council committee appointed some weeks ago to look into the question of the advisability of continuing the use of chlorine in the water. The committee recommended that the present method of treating the water be continued as long as deemed necessary by the Board of Health.

Advocate State Control for Water Supply Companies

Highland Mills, N. Y.—A petition to Assemblyman John D. Stivers of Middletown requesting him to do all in his power at Albany this winter to have incorporated water companies placed under the control of the Public Service Commission is being circulated here and has been signed by many resident citizens and property owners. The gradual increase in the water rates by the Commonwealth Water Company of New York in the villages of Highland Mills and Central Valley is the cause of the activity in this direction.

County Water Company Preparing for Big Supply

Portsmouth, Va.—Preparing for a water supply, which in a single unit now under the course of construction, will provide an estimated water supply of from 4,000,000 to 5,000,000 gallons of water daily, the Norfolk County Water Company has begun a great work near the shores of the North Land river, where over one hundred men are now engaged in clearing a large area of low and swamp land, which by means of dams at the lower end will be converted into a lake more than three miles long and with a span at some places of nearly a mile. The work now under construction will cost over $400,000 which has been provided for as the result of a recent bond issue.

Commissioners Wish Authority Over Water

Washington, D. C.—The Commissioners of the District of Columbia believe that transferring the jurisdiction over the Washington aquedct, the filtration plant and appurtenances from the War Department to the District government would result in marked economy in administration and operation charges, would be clearly in the interests of good government, and have so reported on a bill before the House. The Commisioners' report outlines the water system in the District, and says also: "Some of the trunk mains of the city were originally laid by the United States under the control of the War Department to supply the government buildings, and others were laid by the Commissioners for the service of consumers in the District of Columbia. Practically no water is supplied to government buildings and reservations which does not pass through mains under the control of the District Commissioners. In some instances the mains are constructed side by side or cross each other, and the danger of accident and difficulties of location of injury and of repair are thereby much increased and the responsibility as to repairs is difficult to determine."

Kingston's Water Supply Has Improved

Kingston, N. Y.—The Kingston board of water commissioners received a short time ago the following letter from James M. Caird, the recently engaged bacteriological expert, who was to make an analysis of the water once a week until a special chemist shall be established here in town. This, by the way, the board says, will be in the very near future, since Mr. Caird has ordered the necessary apparatus and it is expected daily. The letter follows:

On the annexed sheets will be found in detail the results of the examination of four samples of water collected December 3, 1911. The results show that the filters were operating under the following efficiencies: Color removed, high pressure, 100 per cent; low pressure, 100 per cent. Turbidity removed, high pressure, 100 per cent; low pressure, 100 per cent. Albuminoid ammonia removed, high pressure, 26.7 per cent; low pressure, 14.3 per cent. Required oxygen removed, high pressure, 42.9 per cent; low pressure, 40 per cent. Bacteria removed, high pressure, 99.7 per cent; low pressure, 93.2 per cent. B. Coli-communis removed, high pressure, 100 per cent; low pressure, 100 per cent. The results indicate that at the time these samples were collected the quality of the filtered water was very good and that the filters were working well.

Health Committee Reports Buffalo Water Impure

Buffalo, N. Y.—The Public Health Committee in a report submitted to the Medical Society of Erie County claims that the city's water supply through the Emerald channel and the new water works system which cost the city over $7,000,000 is more subject to contamination from sewage and more deadly to the health of the city than that taken through the old intakes. The present death rate from typhoid fever is more than five times that of many of the large cities of Europe, and sanitarians are in accord, the report asserts, that the city's blighting death rate is due to infection from untreated sewage. The report then refers to Buffalo's responsibility for poisoning the water supply of the Tonawandas and Niagara Falls, and expresses the opinion that intelligent sanitary consideration of the question will come only when the cities of the frontier unite on the problems of sewage disposal and water supply.

Stafford Public Schools to Have Automatic Bubblers

Stafford Springs, Conn.—In compliance with a regulation of the State Board of Health made in accordance with the provisions of a recent act of Legislature, it will be unlawful after January 1 to provide a common drinking cup in or upon the premises of any schoolhouse. The local school committee has therefore notified the teachers in the various districts that the common drinking cups must not be used after the opening of the next term, which will be January 2. In the schools which have running water it will be an easy matter to make suitable arrangements without the use of individual cups, but in the outlying schools where access cannot be had to running water the use of individual cups will be necessary. The school board has already arranged to have two sanitary bubbling fountains installed at the Springs school.

Report Gives Interesting Temperature Data

Schenectady, N. Y.—Interesting data concerning the water supply is given in the annual report of J. Leland Fitzgerald, city engineer, which has been submitted to Mayor Charles C. Duryee, "The quality of the water has remained excellent. Analysis made by the state health department, on file at the office of the city health officer, are practically the same as those of last year," the city engineer announces. In his report for 1910 Mr. Fitzgerald reports that analysis "would seem to indicate that the wells during the past year were drawing their supply from sources nearer the surface of the ground." The absence of frost in the ground was thought to account for the temperature. Temperatures had been taken by the city engineer last year, which have been continued during the year of 1911. In every instance of comparison it is shown that the temperature has been materially lower throughout the last year, which would bear out the statement of the engineer, heavy frost having settled into the ground last winter, protecting the water supply, it would seem. This year, being an open one, the water supply should have a higher temperature next summer. In the winter the water is warmer at the wells than at the extreme end of the water system at the city line in Union street in summer, while the conditions are exactly the reverse in summer. Temperature was approximately uniform both at the wells and the city line on May 17 and October 4.

STREET LIGHTING AND POWER

Extends Gas Line to Elwood

Anderson, Ind.—The Anderson Gas Company has completed a pipe line to Elwood and will supply that city with gas from its plant here. The line is a six-inch main about sixteen miles long. The extension of the service to Elwood made no appreciable difference here, as the company's plant is able to manufacture more than double the amount necessary for this city.

Jersey City Establishes New System of Lighting

Jersey City, N. J.—The new lighting system along Newark avenue, planned by the Business Men's Association and the City Plan Commission to create a Great White Way, went into effect one evening last week. The Great White Way demonstration ran from Greene Street on Montgomery as far as Jersey avenue in Newark. The members of the Street and Water Board, representatives of the Public Service electric plant and a committee from the Business Men's Association, composed of Joseph E. Bernstein, Joseph Perlmutter, Adolph Walter and others, made a survey of the newly lighted streets with a view to ultimately selecting the best style lamp and lamp post. On Exchange place there were magnitite lights on mast arms; on Montgomery street from Greene to Washington, tungsten lamps arranged in clusters of four; on Newark avenue, from Grove to Erie, magnitite twin lights, and near Perlmutters a twin magnitite lamp on a "shepherd's crook" post, the latter being ornamental in design. As the members of the Business Men's Association do not feel that the 4½ ampere lights used gave a sufficient flooding effect, 6½ ampere lights will be placed between Grove and Henderson streets so that a contract may be obtained with the lights already in place, to ascertain if the stronger light will not produce the required effect.

Courtesy *Newark News.*

JERSEY CITY STREET ILLUMINATION.

Will Investigate Lighting

Utica, N. Y.—An investigation into the terms of the proposed new lighting contract offered to the city is promised by the Socialists, who expect to present their results to Mayor-elect Baker or to the public in the form of an open letter or leaflet to be distributed throughout the city. Members of the Socialist party in the city have been quietly at work for some time gathering data, and at the last meeting a letter was read from D. W. Kinney, city auditor of Holyoke, Mass., stating that that city is now paying $45 per year per arc light to the municipal gas and electric plant.

City Electrician Makes Annual Report

Taunton, Mass.—The annual report of Abner Coleman, city electrician, has been made. The principal recommendation is that the fire alarm wires in districts where the greatest fire risks exist shall be placed underground in the conduits provided by the telephone company for that purpose. He recommends that the central office and the fire stations be connected by wires through underground conduits, and also with the pumping station of the water department. The recommendation is one that has been brought to the attention of several preceding councils by Electrician Coleman, and has also been recommended in the reports of the fire department. An illustration of the desirability of such a system was furnished by the memorable ice storm of two years ago, when telegraph and telephone poles were levelled for rods at a stretch through this part of the State. Fortunately Taunton was spared from a bad fire at that time and the damage to the fire alarms was speedily repaired. It served to show, however, that a winter storm is likely to level the overhead wires of all kinds and the property peril would be tremendous. In the grants to the telephone company for underground conduits, a stipulation has always been included that one duct shall be reserved for the municipal wires.

City Sells Electric Light Globes

Lodi, Cal.—The protest made by a few of the merchants against the city selling electric lamps has had no effect on the new enterprise that John Henning, City Superintendent of Light and Water, has entered into. The city has already sold 300 lamps and has placed an order for 500 more. The city makes no direct profit on the sale of lamps, as they are sold at actual cost, the idea being to get customers who use electricity to install the new lamps, which consume a smaller amount of current than the old and cheaper kind of lamps. The city buys its electric current from the Western States Gas and Electric Company, and its contract provides that the city shall pay according to the greatest horsepower used at any time during the month. The city retails the "juice" within the city limits and has a monopoly. There is so much more electricity used at night than in the day time that the city is not making as much profit on its monopoly as it might.

Company Reduces Cost of Lights

Rochester, N. Y.—The Rochester Railway and Light Company in the garb of Santa Claus presents that corporation before the public of Rochester in a new light, but that is what happened this year, when the company made what is virtually a handsome Christmas present worth thousands of dollars to the people of Rochester. In the course of a year more than 265,000 incandescent lamps are used in Rochester and of this number more than 205,000 are carbon lamps and 65,000 are Mazda lamps. The reduction will be from 2 to 40 cents a lamp, according to size. Up to a certain size, the prices will be from 2 to 5 cents lower, and beyond that size the reduction will be much larger, the highest reduction, 40 cents a lamp, taking place on the large Mazda units. This will mean a saving of thousands of dollars to the public of Rochester, and was made possible by the placing of enormous contracts by the company for lamps. In residential lighting, after the original installation, carbon lamps are renewed free, if they bear the company's mark. This qualification is made necessary that there be no imposition. Without it, it would be necessary to look up identification cards in every case, making an enormous amount of labor and consuming valuable time, and other lamps would be brought in to change with which the company had nothing to do. The reduction is in line with the policy of the company in furnishing customers with the most effective lamps at the lowest possible figures. The company has also a plan on foot to increase the efficiency in repairing line troubles, by placing 35 telephones in districts in the city so that repairmen can telephone right to the office for instructions, saving the time used in traveling back and forth. The telephones will be installed so that a man will be within a half mile from one when within the city limits. One will also be installed in Gates and another in Brighton. Work will begin at once. Much credit for the improved lighting system is given to Thomas H. Yawger, superintendent of the electrical department of the Rochester Railway & Light Company.

New Street Lights at Fairbury Are Turned On

Fairbury, Neb.—The city of Fairbury had a unique celebration on a recent Saturday evening, when the new electric ornamental street lights were turned on. The Fairbury Commercial Club had the concert band out and precisely at 7 o'clock every factory whistle in the city sounded and the band played and the people knew that the lights were on. The matter of ornamental lighting of the public square at Fairbury has been under consideration for a number of years and the first step toward securing a fund was inaugurated February 28, 1911, when the Commercial Club gave a minstrel show and part of the proceeds were donated toward the cause of illuminating the public square. A large number of lamp poles have been placed around the square. They are similar to the ones in use at Fremont.

Regulations Regarding Municipal Lighting Plants

Eufaula, Ala.—The city council at a recent meeting adopted the license ordinance and clinched the municipal ownership of the electric and gas plants of the city by raising the tax on these corporations to one thousand dollars. More stringent measures are also being exercised in the management of these municipal corporations, which means pay up or be cut off. The rule is regarded a wise and judicious one if it is not narrowed down to pinch the poor people.

Rochester Installs More Mazda Lights

Rochester, N. Y.—The new Mazda lights that recently have been installed in Colman Terrace by the Rochester Railway and Light Company have been turned on for the first time. The lamps are mounted on concrete posts and concrete poles have been placed in the rear lots to carry those wires that it was impossible to run underground. Rear lot poles have become a feature of Rochester's lighting in the residential districts. As many wires as possible are run underground, but in order to supply the houses with wires for telephone and electric lights it is necessary that some of them be carried on poles, which now are rapidly being removed from the streets to the rear lots of the citizens, who, in nearly every instance, have co-operated with the lighting company in ridding the thoroughfares of the unsightly and, in some cases, dangerous poles and wires.

FIRE AND POLICE

Klaxton Horns Will Sound Warning to Clear Streets

Binghamton, N. Y.—On the new boulevard lighting standard at the corner of Washington and Court streets four Klaxton horns will take the place of the present bell in use by the fire department. When a box is pulled the horns will sound the alarm vigorously, clearing the streets of all vehicles and giving the fire department the right of way. Measurements were made for the fire department cable by representatives of the factory now preparing it, and it is believed the cable will reach this city soon.

New Fire Signal in Use

Chicago, Ill.—A new signal system has been installed in the quarters of fire engine company No. 2, at Clinton and Washington streets, which it is said will prevent collisions with street cars and other vehicles as the firemen leave their quarters to respond to alarms. The system consists of a red light and a bell which rings when the horses are released from their stalls. The alarm is said to be a success by Captain Rogers of the engine company. They probably will be installed in all fire and police barns which face car lines.

New Fire House Opened.

Newburgh, N. Y.—The fine new fire house of Chapman Steamer Co. has been turned over to the company officially by Mayor McClung on behalf of the city, and the building accepted on behalf of the company by Michael Donahue, one of the veteran members of the organization. The Dubois street fire house, the best appointed in the city, completed only last fall, was the scene of a notable gathering of firemen, as all the companies in town took part in the parade preceding the official turning over of the house to Chapman Steamer, and escorted the company and its apparatus from the South street home which it has occupied for the past forty-eight years.

New Auto Fire Truck

Macon, Ga.—The mayor and council of Macon have voted for the purchase of a new automobile truck for the fire department to take the place of a horse drawn apparatus. The machine has been ordered from a St. Louis company and is expected here for duty within a short time. The city firemen are looking forward to its arrival with much pleasure, as the auto machines are much less trouble than the horse drawn machines.

Chief and State Authorities Will Inspect Buildings

Mount Vernon, N. Y.—Early in January Fire Chief Ehrbar assisted by authorities from Albany will begin an inspection of all of the buildings in the business section ot the city, tenements and apartment houses, and any one family residences where it is believed state laws relative to fire protection are not being adhered to. He declared that there was danger now of fire starting from quantities of paper stored in the cellars of business blocks, tenements and even in private residences and deplored the fact that children are allowed to use matches so freely, calling attention to the fact that within a few weeks there have been two fires due to that cause.

Engine Companies Have Reconstructed Fire Apparatus

Paterson, N. J.—Fire Chief John Stagg has received word that the motor fire apparatus for Nos. 1 and 5 engine companies have been shipped. The hose wagons have been converted from horse drawn to auto propelled machines. The work was done in Detroit. The work of changing over the fire engines was done in Minneapolis. With the exception of the chemical tanks and the box for the wagons and the reels, there is little left of the old wagons. They have new running gear and are painted red, the new color which is gradually being adopted for the department. The driving engines are capable of a speed of about thirty miles an hour, with sufficient power back of them to drive them up over the steepest hills, even with a full complement of men and a load of hose, that being one of the conditions of the contract.

Tacoma's Loss by Fire $10,567

Tacoma, Wash.—According to the monthly report of Fire Chief George McAlevy, Tacoma's fire loss in November was $10,567. The loss was covered by insurance of $77,100, of which sum $9,407 was paid, $8,205 being paid on contents. Fire loss on buildings was but $1,317, while on contents it amounted to $9,250. Insurance carried on buildings was $58,500 and on contents $18,600. The department responded to 48 alarms, nine of which were false. The fire department's expenses for the month were $18,209.81, of which $11,038.05 was for salaries.

Gadsden Purchases Auto Fire Truck

Gadsden, Ala.—The finance committee of the city council has purchased an auto fire truck, which will be added to the fire fighting equipment of the department. The machine cost $5,500 and the city has four years in which to pay for the machine, the first payment of $1,000 to be made thirty days after the automobile is accepted. It is believed the machine will mean a saving to the city. One of the advantages of having the automobile fire truck will be that fewer horses will be required at the Central station. There have been six horses maintained here at an expense of $1,200 a year.

Fire Board Makes Annual Report and Recommendations

Holyoke, Mass.—The annual report of the fire commissioners was filed at the last commissioners' meeting in the High street engine house. The report indicates progress in every branch of the department, the suggestions recommended in the report being up to date and ones which are demanded to keep the department in a high state of efficiency. Particular interest is attached to one recommendation by the commissioners suggesting that the couplings of all lines of hose in the fire department be changed from the clamp coupling to the screw coupling which is in use in all the larger cities. The gradual abolishment of all horse driven apparatus in the modern fire departments throughout the country has been closely followed by the local department. The number of horses now used to draw the local fire apparatus numbers 34, and the commissioners express the hope that the time will soon come when horses will no longer be used in Holyoke to respond to fire calls, but that motor driven apparatus exclusively will furnish the fire-fighting apparatus of the local department.

Automatic Locking Device for City Jail

Montgomery, Ala.—An automatic locking device for the city prison, a device invented by City Engineer Gilchrist, is now being manufactured in Montgomery to be used on the cells at police headquarters. This device will be installed to comply with the requirement of State Prison Inspector Oates and will probably be ready for installation within a short time.

Police Commissioner Wants City Control of Pawn Shops

Dallas, Tex.—Police Commissioner F. W. Bartlett has turned his attention to pawn and junk shops, and has asked City Attorney Collins to rule as to the possibility of an ordinance that will put such places under practically the same rules as to licenses that apply to saloons. The ordinance covering saloon licenses empowers the city commission to forfeit such licenses when the general reputation of the proprietor is bad. The activity of the police commissioner is the result of his conviction that some pawn shops and junk shops in Dallas are a strong incentive to burglaries and thefts, since he declares they afford a ready market for stolen goods. The fact that in many instances persons from whom property has been stolen are practically forced to pay such dealers for its return is a further reason for the police commissioner's belief that these places should be held strictly accountable for receiving stolen goods. Chief of Police John Ryan declared his belief that "fences" for stolen goods probably increase burglaries and thefts in Dallas 50 per cent.

Railway Takes Fire Precaution

Schenectady, N. Y.—The Schenectady Railway Company is expending $35,000 in equipping its barns with automatic sprinkling systems, which, when completed, will be one of the largest installed in this city outside of the General Electric Company's works. Reservoirs, mounted on high towers, and each having a capacity of 40,000 gallons of water, have been erected both at the McClellan street and Fuller street barns. The automatic sprinkler systems are so installed at the barns as to throw streams of water into cars as they stand on the tracks in the shed, in case of a fire. The cars would be enveloped in sheets of water, preventing the spreading of the blaze to other cars. A line of sprinklers is placed overhead between each track in the sheds. The system at the McClellan street barn has 14,000 sprinkler heads, while the one at the Fuller street barn has 12,000.

GOVERNMENT AND FINANCE

Commission Form Wins

Gulfport, Miss.—Gulfport citizens approved the commission form of government for the city at the special election. The vote was 296 to 311.

Commission Form of Government Adopted

Laurel, Miss.—The qualified voters of the city of Laurel adopted the commission form of government by a vote of 264 to 194. The petition provides for the election of three commissioners, one of whom will serve as mayor. The mayor will be paid $2,000 a year and the commissioners $1,800 each. All other city officials will be named by the commissioners.

Commission Government Rejected

Green Bay, Wis.—In the recent election the commission form of government was rejected. In speaking of the outcome of the election a member of the Citizens' Committee said that the committee feels confident that time will change the adverse opinion on commission government held by many of the voters and that the question will be carried in another year.

Council May Adopt Efficiency Bureau

Los Angeles, Cal.—For the purpose of making more effective the principles of the civil service, an efficiency bureau may be established by the City Council. F. M. Dee, chief examiner for the Civil Service Department, has outlined a plan to the commission and the Council will be asked for an appropriation of $25,000 for the first year's work. Dee says the objects of the efficiency bureau would be to fix a standardization of employment, to readjust salaries, to regrade and reclassify the positions with a view of promotion, to establish individual efficiency records and to advise the City Council as to the proper amount for the budget at the close of each fiscal year.

City Clerk Issues Charter Manual

Saginaw, Mich.—City Clerk Wm. F. Jahnke has compiled and published a "Manual of Charter Commission, Saginaw, Mich., 1911," the title being indicative of its scope. It is a complete little pamphlet, giving names and addresses of officers; the home rule act for cities; the full list of committees, etc.; digest of rules; order of business, and such other information as is necessary in order to quickly grasp the composition, purport and other details in regard to the commission.

Municipal Election

Detroit, Mich.—January 23 has been fixed by a common council committee as the date for a popular vote on municipal ownership, or an extension of present franchises of Detroit street railways until 1924, with eight tickets for a quarter in the daytime and six at night, and universal transfers. The latter proposal includes a provision for municipal ownership on demand of the city.

Will Establish Bureau of Efficiency and Economy

Schenectady, N. Y.—Mayor-elect George R. Lunn is thinking of establishing a bureau of efficiency and economy for the standardizing of municipal purchases. The bureau will come under the jurisdiction of the department of the public works. The head of this bureau will also be clerk of the board of contract and supply. The duties of the new official will be to see to the standardizing of all purchases. He will be responsible for all purchases. The new administration will make no small purchases, in so far as possible. Supplies will be bought in bulk and distributed through the new bureau to the several departments. This will include everything from an ink eraser to a boat load of paving brick.

City Will Have Revised Copy of Present Charter

Binghamton, N. Y.—Shortly after the first of the year, Binghamton will come into possession of that which has long been needed—a revised copy of the present city charter. Since the charter was passed by the Legislature five years ago, the only copies owned by the city have been some pamphlets printed by the State when the bill was introduced and sent to the city officials. Last year an appropriation was made to print and bind 500 copies of the charter, and the Common Council accepted an offer to index the charter in accordance with the latest methods, free of charge.

City Commission Completes New Charter

Bemidji, Minn.—Radical changes are proposed for the city government of Bemidji in a new charter just completed by a commission of fifteen appointed last May by Judge C. W. Stanton. These changes provide that the mayor shall serve two instead of one year, and that instead of receiving no salary he shall be paid not to exceed $300. The term of office for alderman shall be lengthened from two to four years and that each alderman may receive remuneration of $2 for each meeting, not to exceed $100 a year. The alderman-at-large may receive not to exceed $100 a year. A park board of five members is provided for and $500 for open-air concerts in the summer and indoor concerts in the winter is included. Public inspection of dairies and creameries is provided. The new charter is not constructed in harmony with the commission form. This charter is to be voted on at the annual city election on February 20 and must receive a three-fourths vote to become operative.

Charter Framers Propose Radical Council Changes

Kalamazoo, Mich.—Radical changes were made tentatively in the city charter by the members of the Charter Revision Commission at its last meeting. The plan is to have the council of 16 members elect a president who shall preside over all meetings. Under the present system the mayor presides. The commission thought that with the administrative boards and his cabinet the mayor will under the new form have all he can take care of without the council. He will be allowed the privilege of the floor at the council meetings and may send messages on important subjects. The tentative plan provides that the council meet the first Monday in every month, with special meetings at the call of the mayor, president of the council or three of its members. All proceedings of the council will be published either in pamphlet form or in a newspaper, including the aye and nay vote on all questions. The city clerk will be clerk of the council.

STREET CLEANING AND REFUSE DISPOSAL

Snow Removal Orders

Philadelphia, Pa.—Orders relative to cleaning snow from pavements have been issued by Director Porter to the police lieutenants with instructions that the residents in their districts be made familiar with the orders, which are as follows: On business thoroughfares and crowded streets, the sidewalks must be entirely cleared of snow, as heretofore. On residential streets and less frequented business streets, the sidewalks to be cleaned of snow from the house line to a point about three feet inside the curb line, so as to leave a passageway at least four feet in width, and the snow piled on the sidewalk near the curb instead of being thrown in the streets. A gutter must be made of at least one foot in width on every street and on streets having wide sidewalks, a gutter of at least two feet in width, especially at street corners and crossings, where the gutter must be of sufficient width to insure proper drainage. Lieutenants will continue to bring in reports, as in previous winters, of all cases in their respective districts where the snow is not removed from the footways and gutters in accordance with the above regulations.

Rochester Building New Incinerating Plant

Rochester, N. Y.—An inspection of the new municipal incinerating plant on the River Flats has been made by a party of city officials headed by Mayor H. H. Edgerton, City Engineer E. A. Fisher and Commissioner of Public Works F. T. Elwood. The new plant, in which all the rubbish of the city is to be burned, will be put in operation early in January, the exact date not yet having been fixed by the authorities. There will be quite a few additional employes placed on the city's pay roll when the incinerating plant is put in operation. Only the rubbish collected will be burned at the plant. The glass, paper and all other salable refuse is to be sorted from the useless rubbish. The city will derive from $20,000 to $25,000 a year from this salable stuff. It was at first planned to collect only the rubbish within a half mile radius of the plant, but when it was decided to have separate receptacles for the rubbish it was deemed practicable to make the collections general. Collections will be made more frequently in the congested sections than in the outlying districts of the city. The incinerating plant is being built by the DeCarrie Company, of Minnesota, and including the site, cost about $100,000. The plant will be under the jurisdiction of the commissioner of public works.

Drastic Means to Prevent Illegal Dumping of Dirt

Detroit, Mich.—"Watch the contractors who are in the habit of dumping dirt in the alleys and furnish the department with proof of any such violation of the ordinance," is going to be the substance of an appeal that D. P. W. Commissioner Haarer intends to make to the public shortly, either by a communication to the Common Council or directly to the people through the newspapers.

"I am even considering recommending to the council that the ordinance be amended so as to prohibit entirely the use of dirt wagons that can be dumped by working a lever," said the commissioner. "That seems a harsh thing to do and looks like a return to primitive methods, but something must be done to stop the abuse of having dirt dumped in the alleys to save the expense of a long haul. By actual count in the last two weeks, there have been 66 wagon loads of dirt dumped in alleys, and we have not been able to get a valid case against a single one of the offenders. Last year about 1,300 loads were dumped in alleys, and besides the cost of removing the dirt, which averages upwards of $2 a load, there is the annoyance to the department and the unsightliness of the alleys to be considered. Some of the teamsters smear their license numbers with mud, others drop a horse blanket down so that the number cannot be made out by any casual spectator, and all sorts of dodges are resorted to to get away with this sort of grafting. Citizens have a perfect right to step up and insist on reading the number on any licensed wagon, and I think if the public will take an interest in this matter, which concerns them more than anybody else, we can soon put a stop to the practice. I am also going to ask the public to be more careful about throwing papers into the streets and alleys. Loose paper looks worse and makes more trouble than any other form of refuse, and a little care on the part of householders will do a lot to create better conditions."

Women's League Provides Waste-Paper Cans

Baltimore, Md.—The Women's Civic League has had 100 waste-paper cans placed on street corners in Baltimore, in addition to the 56 already stationed on downtown streets, and in many cases the placing of these cans has resulted in a distinct improvement in the vicinity; but in some localities the cans have remained empty and in others they have proved a source of annoyance to the neighborhood because the children have used them as drums.

RAPID TRANSIT

New Cars Display Signs

Jacksonville, Fla.—Ten new street cars of the latest design, recently purchased by the Jacksonville Traction Company, have arrived in the city and have been put in service. These cars, of the design known as the turtle back and similiar to those now being operated on the Riverside line, are regarded as the last word in car construction, being of the standard type used by the local company. They have a seating capacity of forty people and in addition will accommodate several more on the platforms. They are all-steel and have larger platforms than those hitherto in use on the local system. A radical departure from the present car, which is embodied in the more recent type, is the display of signs showing the destination of the car, which may easily be seen as the passenger approaches the stopping point of the car which he wishes to take.

Electric Railway Company to Pension Employes

Milwaukee, Wis.—The Milwaukee Electric Railway and Light Company, which operates most of the electric railways in and about Milwaukee, will announce to employes the establishment of an old age pension system, the establishment of a loan fund and a mutual benefit association. The company expects to contribute about $30,000 a year to maintain these propositions and a small tax will be levied.

Railway Extended

Muskogee, Okla.—Following the announcement that the Missouri, Oklahoma & Gulf Railroad Company had decided to extend its lines north from Wagoner, Okla., to Kansas City and south from Sherman, Tex., to the Gulf, came the information that the same road would be electrified between Wagoner and Muskogee, and that an electric line would be extended east from Wagoner to the Grand river, where an amusement park will be built. The citizens of Wagoner have raised a bonus of $6,000 for this, and are promised work will begin within sixty days. Hourly motor car service is to be established between Wagoner and Muskogee.

Short Line Franchise Extended by Council

Tacoma, Wash.—The Seattle-Tacoma Electric Railway Company, which is constructing the proposed new interurban short line from Tacoma to Seattle, has been granted an extension of its franchise to January 10, 1914, by the municipal commission. The commission provided that $100,000 worth of work must be done on the line in six months, and that within that time $20,000 of the work must be done in Pierce County, or else the franchise would be declared forfeited and the city would get the original $1,000 forfeit deposit of the company.

Railway Donates Street for Present

Topeka, Kan.—The Topeka Railway Company has given a Christmas present to the city of Topeka. This present is an entire street more than 60 feet wide, a continuation of Buchanan Street from Twenty-first to Twenty-second Streets. Also a wagon and foot bridge across the Shunganunga creek at this point. The street railway company is building its line down Buchanan Street across the Shunganunga.

New Trolley Line from Youngstown to Poland

Youngstown, O.—A trolley line to Poland is assured. The promoters have been awarded a franchise by the village council. It is given to Judge George E. Rose and Attorney John T. Harrington, of this city, their heirs and assigns. It is believed that the line will ultimately become a part of the Mahoning and Shenango Railway & Light Company, which now controls the trolley and light franchises of the Mahoning and Shenango valleys. The road will traverse a section recently purchased by Judge Rose and associates, who have platted the land for home sites. Poland is six miles from Youngstown, and the boyhood home of the late President McKinley. The trolley line will open up for suburban residences the finest section of Mahoning County, and already a boom in real estate values has been noted.

Indianapolis-Chicago Line Assured

Valparaiso, Ind.—The Board of Commissioners of Porter county in special session has given the officials of the Chicago, Indianapolis & Meridian Electric Interurban Railway permission to use the streets of Wheeler for car lines. All the remaining right-of-way having been previously acquired, this action assures the line through this county from Indianapolis to Chicago.

Trolley to Bluemont

Washington, D. C.—A deed has been recorded by which the Great Falls and Old Dominion Railway Company, operating an electric line between the Georgetown end of the Aqueduct bridge and Great Falls, has transferred to the Washington and Old Dominion Railway Company all interests except its right to be a corporation. The Washington and Old Dominion Company was recently incorporated under Virginia laws and by the same interests that control the Great Falls railway. The new corporation has acquired the right of way across Alexandria County from Dominion Heights to Bon Air, where a junction is to be formed with the steam road that runs between this city and Bluemont. The steam road was leased for a term of fifty years by the new corporation and preliminary work has been in progress for some time toward the conversion of the steam road into a trolley line from Bluemont to Georgetown.

MISCELLANEOUS

Atlantic City May Have "Stoy Day."

Atlantic City, N. J.—Unless plans made at the last 1911 meeting of the council fail the birthday of the late Mayor Stoy will be made a municipal holiday. Acting Mayor Carmany, who has filled the office since the death of Mr. Stoy, offered a resolution to request Mayor-elect Bacharach to designate it as such, and the resolution was adopted with enthusiasm.

City Planning to Be Taught in Graded Schools

Chicago, Ill.—City planning and citizen building now form a regular part in the curriculum of eight graded schools in Chicago. The Board of Education has decided to install a complete course in the planning of cities, with regard to sanitation, economic arrangement of business transportation, residence, factory and commercial districts, elimination of slum squalor and inconvenience. Attention will be paid to the art of the landscape gardener.

Citizens Give Money to Help City Planning Movement

Erie, Pa.—Thirty-three citizens have joined the city planning movement for which a fund of $10,000 is being raised by pledges of $50 by the special committee of the Chamber of Commerce. The committee looks for pledges to come more rapidly after the holidays. Arrangements have been made with all the Erie banks, so that upon application to the cashier, pledges may be made out to the committee. Money will not be required to be paid until the committee incurs expenses in actual work. Several letters have been received from architects and engineers, volunteering their time and professional services in connection with any preliminary work, or any work to be done under the supervision of an expert.

Mayor Plans a Municipal Museum

Rochester, N. Y.—A municipal museum for Exposition Park is planned by Mayor H. H. Edgerton. Building Nine, in which a heating plant is being installed, is to be turned over to the use of the Grand Army of the Republic and the Rochester Historical Society. The relics of the Historical Society and the G. A. R. will form the nucleus of the municipal museum. Building Nine is south of the peristyle. During the exposition of last September the art exhibit was held in the building. The veterans, who are now meeting in inadequate quarters in the Municipal Building, are to be given a big room of the second floor and special space for the historical and war relics. A public library branch will be located in the south end and the Historical Society in the north end.

Municipal Improvements During Year Aggregate $590,950

Pasco, Wash.—The fact that Pasco has spent more than half a million dollars during 1911 for improvements to the city is the answer of the business men of the city as to why they will give a "Midwinter Carnival." Exactly $590,950.94 is the actual cost of the municipal improvements completed here or well under way during the year. Ostensibly the carnival is planned as a celebration of the new electric lighting system, 84 new ornamental three globe lights having been installed in the business district of the city. Really the affair is of wider scope and will celebrate the completion of 23 blocks of paving, the beginning of the $100,000 sewer system, concrete sidewalking throughout the city, new city hall, ward school and public library. In addition to the work completed by the city, something like 220 residences were built.

Seattle to Establish Municipal Paper

Seattle, Wash.—The judiciary committee of the city council has approved for submission a proposed charter amendment authorizing the publishing and circulating of a municipal newspaper in which all legal notices pertaining to the city shall be printed. Spokane has a municipal paper published weekly, and Los Angeles voters recently decided to establish such a paper.

City Work Totaling $626,046.70 Finished

Tacoma, Wash.—Municipal contracts totaling $626,046.70 have been completed and accepted by the city this year, according to the monthly report of Commissioner of Public Works Owen Woods. The report shows that during November contracts aggregating $22,534.85 were completed and contracts totaling $20,056 were awarded. At present there are under way contracts amounting to $843,198.85. These contracts include those for the construction of the two vertical lift bridges over the Puyallup river and the middle waterway on 11th Street. In addition to this work the city has under way the power and the gravity water system projects, which work will cost about $4,000,000 when finished. The street cleaning department, according to Commissioner Woods' report, washed 224,000 square yards, or 8.52 miles during the month. Cartmen also covered 335.79 miles of pavement, while horse-sweepers cleaned 151.39 miles of paved street. Receipts of the department for the month amounted to $3,033.80, while the departmental expenditures were $19,499.20, which added to miscellaneous expenses in repairs to various municipal buildings and street and sewer inspection brought the expenditure to $33,340.80. The sweeping of streets cost $2,761.26, while the washing cost $105.70. Sidewalk repairs amounted to $4,541.88.

Cutting the High Living Cost

Indianapolis, Ind.—Mayor Shank's personally conducted sale of potatoes and turkeys at cut prices has inspired the formation of an association to reinforce the mayor in his "war on the middleman." The 2,000 shares of stock in the Wage Earners' Co-operative Association has been put on sale at $5 a share. Its organizers plan to open a depot where the ultimate consumer of foodstuffs shall meet the producer, thereby eliminating the jobbers' profits. The campaign for extended membership will be made largely through the Central Labor Union.

Pasadena Plans Merger of Public Utility Plants

Pasadena, Cal.—To hasten the affiliation of the cities of Pasadena, South Pasadena and Alhambra in one system of public utilities such as water, sewer, light, power and park systems, the South Pasadena Chamber of Commerce, through its president, J. D. Reavis, and its secretary, W. B. Taylor, has addressed a letter to Mayor Thum and the council of Pasadena inviting them to appoint a committee of three councilmen to confer with committees from the other municipalities. Mayor Thum said that the committee probably would be appointed at the next regular meeting of the council. The governing body of Alhambra has been asked to appoint a committee to help work out the project. Committees from the Pasadena Board of Trade, the South Pasadena Chamber of Commerce, the South Pasadena council and the Alhambra Board of Trade already have been appointed and as soon as the committees from the Pasadena and Alhambra councils are appointed joint sessions will be held and each committee will report back to its appointing body the results which have been achieved.

New Municipal Building in Berlin

Berlin, Germany.—The accompanying illustration is a view of the new municipal building, designed by Ludwig Hoffman. The style of architecture is that of the Fifteenth Century. The building, approximately rectangular in shape, occupies a block over 100 meters square.

NEW MUNICIPAL BUILDING, BERLIN, GERMANY.

To Sell by Weight, Not by Measure

Holyoke, Mass.—A movement is on foot in Holyoke to effect the sale of vegetables and produce by weight and to exclude the sale of the same by measure. Sealer of Weights Joseph Goddu is interested in the accomplishment of the movement and prophesies its eventual success on the ground that selling produce by measure enables the dealer to give a short measure. A bill providing that produce be sold exclusively by weight will be introduced in the Legislature at the coming session and will be strongly urged by the sealers of weights and measures from the various towns throughout the State.

Mayor Sees Way to Build Crematory

Atlanta, Ga.—Mayor Winn is desirous of having a crematory built as soon as possible on the site purchased some time ago for the purpose. He recently explained his plan in the following words: "My plan is this: Let us secure estimates on the cost of a crematory and reduction plant upon that site—plants of such size that they will meet the city's needs for 25 years to come. Then let us put it up to the manufacturers of the plant to finance the proposition. The city charter prohibits the city going in debt from one year to another. But we will have the bond issue of $50,000 as a nucleus, and Council can probably supplement that with another $50,000 in 1912. A plant of the size we need would cost about $250,000. This would leave only $150,000 to be raised.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Trading Stamps—Ordinance—Validity

Sperry & Hutchinson Co. vs. City of Tacoma et al.—The use of trading stamps in retail merchandising business is legitimate, and an ordinance imposing an excessive license fee on merchants using such stamps, with the evident purpose of preventing such use, is unconstitutional and void, and a complainant whose contract rights are injuriously affected thereby is entitled to an injunction to restrain its enforcement.—United States Circuit Court, 190 F. R., 602.

Acquisition of Parks—Questions Reviewable

Londoner vs. City and County of Denver et al.—Under Constitution 20, relating to the city and county of Denver, and conferring on the people thereof every power possessed by the Legislature in the making of a charter, the people of the city and county of Denver may adopt a charter containing provisions for the purchase or condemnation of lands for parks and parkways, and the payment therefor in whole or in part by assessments made on property within districts specially benefited, notwithstanding the provision in section 1 empowering the municipality to construct, condemn, and purchase waterworks, light plants, power plants, transportation systems, and other public utilities, the provision not measuring the extent and limitation of the power to acquire lands for other public purposes. The acquisition of lands for parks is for a public purpose, and a municipal corporation may be empowered to condemn land for such purposes at the cost of the property within districts specially benefited by the improvements. A suit to restrain the city council of the city and county of Denver from passing an ordinance for the acquisition of lands for parks and parkways was dismissed after denial of an injunction. Pending a writ of error the city council in good faith passed the ordinance. No application was made to the Supreme Court for a stay, and no stay was issued against the council pending the determination of the writ. Held, that the Supreme Court must dismiss the writ of error on the facts being brought to its attention by a plea in bar, since it could not nullify the legislative action of the council, and since a reversal could accomplish nothing.—Supreme Court of Colorado.—119 P. R., 157.

Defective Streets—Street Car Passenger

City of Louisville vs. Arrowsmith.—A complaint alleging that plaintiff was injured through the joint and concurrent negligence of a city and street railway company, the negligence of the city consisting in permitting the street to remain unsafe for public travel, and the company's negligence consisting in starting a car suddenly while plaintiff was alighting, and that starting the car caused her to lose her balance and threw her into a hole constituting the defect in the street, etc., shows liability of the city. In any action against a city and a street railway company for injury to a passenger caused by her being thrown by the sudden staring of a car from which she was alighting into a hole in the street, failure to define "proximate cause" of the injury in the instructions was not error. In an action against a city for injury to a traveler caused by a defect in a street, photographs taken some time after the accident were admissible in evidence to show the condition of the street where witness other than the photographer testified that they accurately described the condition of the street, and there was no contention that the condition of the street had changed since the accident. That a street railway company was primarily bound to repair a defect in a street near its tracks does not relieve the city from liability to a traveler caused by such defect. In an action for personal injuries against a city and a street railway company, it was not prejudicial error for plaintiff's counsel to state in his argument to the jury that the case against the city was stronger than the case against the company and that he preferred a verdict against the city, especially since the jury were admonished that they must be guided by the instructions alone, and the instructions authorized recovery against either or both of the defendants.—Court of Appeals of Kentucky, 140 S. W. R., 1022.

Special Elections—Majority Vote

Tone et al. vs. City of Denison et al.—Under a city charter authorizing special taxes on a majority vote of the property owning taxpaying voters of the city, a majority of those voting at a special election, public notice of which has been given, is sufficient to authorize the levy of special taxes.—Court of Civil Appeals of Texas.—140 S. W. R., 1189.

Assessment Districts—Decision of Commissioners

In re City of Seattle.—A decision by a Municipal Board fixing the limits of a street improvement assessment district, or refusing to apportion part of the expense against the city's general fund, will not be disturbed by the courts, where there may be difference of honest opinion as to the fairness of the decision.—Supreme Court of Washington, 119 P. N., 5.

Damages in Flooding Mine

Kelly vs. City of Butte—In an action against a city for the flooding of plaintiff's mine during the progress of work in the construction of a sewer, whether such flooding resulted from the city's negligence in carrying out a general plan of excavation for the extension of its sewer, without providing an efficient method to protect the ground from waters flowing down a gulch from above the excavation, held for the jury.—Supreme Court of Montana, 119 P. R., 171.

Asphalt Patents—Infringement—Injunction

Beyerley vs. Ellis Co.—Where, in an earlier adjudication of a patent, a rule determining infringement or non-infringement upon a given state of facts has been laid down or recognized by the appellate court, a lower court, in subsequently dealing with the patent on a similar or substantially similar state of facts, is as much bound to follow such rule of infringement as to recognize the validity of the patent theretofore upheld by the higher court.

The Byerley patent, No. 524,130, for a process of making asphaltic products from the residuum of petroleum after distillation and for the product itself, held valid and infringed, on a motion for preliminary injunction, following prior adjudications.—United States Circuit Court, 190 F. R., 772.

Street Obstructions—Liability—Independent Contractor

Beyerley vs. Ellis Co.—Where, in an earlier adjudication lieve itself from the duty to keep its streets in proper repair by transferring it to an independent contractor, and it will be responsible for the acts of a contractor if the matter involved in his contract is one of absolute duty owed by the city to an individual, or if the work is intrinisically dangerous, or if, even when properly done, it creates a nuisance, so that a municipality which authorizes the performance of work which necessarily renders the streets dangerous is liable for injuries due to the absence of barriers, lights, and other precautions for safety, but it will not be liable for acts of the contractor where the injury is through some negligence of the contractor in a matter in which the city owes no duty to the person injured.—Supreme Court of North Carolina, 72 S. E. R., 966.

Ordinances—Record of Passage

Martin vs. City of Greenville.—The record page showing the minutes of a city council meeting when a stock ordinance was passed, declared that a regular meeting of the council was held March 7, 1910, with five members present, and that the mayor was absent and one of the members of the council chosen mayor pro tempore. The minutes then showed certain other business transacted which was set down in order, underneath which was a printed copy of the ordinance pasted on the sheet, and at the left of the printed slip were the words, "The following ordinance, having been properly introduced and laid over, was by vote adopted." At the bottom of the page were the words, "On motion, body stood adjourned," signed by the clerk and mayor pro tem. All the writing on the pages was on horizontal lines, except the part relating to the ordinance; the words relating to its passage being written to the left of the printed matter and run up and down the page. Held, that the signatures operated to verify all that was written on the page, and that the record showed the ordinance was properly adopted.—Court of Appeals of Kentucky, 140 S. W. R., 1045.

NEWS OF THE SOCIETIES

American Society of Civil Engineers.—The fifty-ninth annual meeting will be held at the Society House, 220 West 57th street, New York City, January 17-18, 1912. The annual reports will be presented, officers for the ensuing year elected, and members of the nominating committee appointed.

WEDNESDAY, JANUARY 17.

It is expected that progress reports from several special committees will be presented for discussion.

Four excursions to points of interest have been arranged as follows:

1. Aqueduct Shafts. Through the courtesy of J. J. Waldo Smith, chief engineer, board of water supply, members are invited to inspect some of the shafts of the city tunnel of the Catskill aqueduct. Those who wish to do so should assemble at shaft 17 at 2:30 p. m.

2. Grand Central Terminal Improvement. Through the courtesy of George W. Kittredge, chief engineer, New York Central & Hudson River Railroad, and G. A. Haywood, chief engineer, electric zone improvements, an invitation has been given to inspect the Grand Central terminal improvements. Party will assemble at 2.30 p. m. in the temporary concourse of the Grand Central Palace, near the entrance of Lexington avenue, opposite 44th street.

3. Subway Work, Fourth Avenue, Brooklyn. Through the courtesy of Alfred Craven, chief engineer, public service commission, and the Bradley Contracting Company members are invited to inspect the portion of the subway work now in progress between the junction of DeKalb avenue with Flatbush avenue and the junction of Pacific street with Fourth avenue. The inspecting party will assemble at 3 p. m. at the sub-office of the contracting company, Fulton street and Hudson avenue.

4. Mount Prospect Laboratory. Through the courtesy of I. M. de Varona, chief engineer, department of water supply, gas and electricity, members are invited to visit the laboratory located at Mt. Prospect reservoir, Flatbush avenue and Eastern parkway.

Reception, 9 p. m. Presidents' reception at the House of the Society for members, ladies of their families and guests. Informal dancing.

THURSDAY, JANUARY 18.

The day will be devoted to an excursion to the Bush Terminal in South Brooklyn. The steamer Nassau will leave the pier at the foot of West 23d street, North River, at 9.30 a. m., and will make a stop at Pier A, North River, leaving there at 10.15 a. m. It is expected that a landing will be made at the Bush Terminal at about 11.30 a. m. After looking over part of the plant, luncheon will be served by joint invitation of the Turner Construction Company and the Bush Terminal Company, and the plant will be further inspected.

Smoker, 8.30 p. m. Informal smoker at Society Home.

FRIDAY, JANUARY 19.

Topical Discussions, 10 a. m. "Drainage and Foundations." Discussion opened by James Owen. "Fillers for Brick and Block Pavements." Discussion opened by George W. Tillson. 2 p. m.: "Bituminous Surfaces." By A. W. Dean.

SATURDAY, JANUARY 20.

Topical Discussion, 10 a. m. "Use of Bituminous Material in Penetration and Mixing Method." Discussion opened by Linn White.

Indiana Sanitary and Water Supply Association.—The association, in affiliation with the State Board of Health, is calling public attention to the fact that the conservation of the streams and lakes of Indiana is a matter of very great importance and should be speedily taken up. The U. S. Hydrographic Survey shows the ground water level of Indiana is receding at a rapid rate. In some localities, in the last decade, the water has fallen 20 to 50 feet.

Formerly, in the central part of the State, a well 10 or 12 feet deep would furnish abundant water for a family and its live stock at all seasons. Now wells must be driven 30 to 40 feet and are apt to go dry in seasons of drought. In the sections of the State where flowing wells exist, many have ceased to flow and all that are still flowing show a decreased head. All over the State it is observed that springs, formerly unfailing, have dried up or show a greatly reduced flow. It is a common remark of even our middle-aged people how our rivers, creeks and branches have decreased in size.

The water supply problem becomes acute in many counties every summer. Water companies find it necessary to issue warnings and request patrons to practise economy in the use of water. The water problem is a serious one in the White River Valley and when the slogan "Indianapolis and 500,000" is uttered, it is pertinent to ask, From whence will water be obtained for a city of this size? The ground supply is near exhaustion and White river must be depended upon. For this purpose it must be conserved in all practicable ways. There may be no reason for immediate alarm in some sections of the State, yet the State is drying up and before fifty more years have passed the entire State will have to consider the water problem. The only step taken in this matter so far by the State is the statute against the pollution of streams, but nothing has been done in the matter of reforesting or impounding.

Ths association does not desire to cause alarm but wishes to let the people know that a momentous problem must be solved in the near future. To the end that this question may be given consideration, the Indiana Sanitary and Water Supply Association in affiliation with the State Board of Health will ask the mayors of all cities to appoint delegates to the fourth annual convention of the association at Indianpolis on February 15 and 16, 1912. The program for this meeting includes papers by the leading experts of the country along the lines of sanitary and water engineering, and the problem of conserving the water supply of Indiana will be discussed in detail. Every citizen is vitally interested in these problems and every mayor should see that his city is represented at this meeting.

Association for Standardizing Paving Specifications.—The third annual meeting of the association will be held at the Hotel Grunewald, New Orleans, La., during the week of January 8 to 13, 1912. Reservations may be made through Capt. W. J. Hardee, city engineer of New Orleans. In order that the work of the committees may be expedited and just criticism avoided as much as possible, the association requests that any person advocating changes in the specifications as printed in the copyrighted proceedings of the second annual meeting held at New York in January, 1911, address the chairman of the proper committee in writing, suggesting such changes and the reasons therefor. All communications dated on or after January 4, 1912, should be addressed in care of the Hotel Grunewald, New Orleans, La. This announcement is by John B. Hittell, secretary-treasurer, 5917 Winthrop avenue, Chicago.

Municipal Association of Cleveland.—Letters have been mailed by the Municipal Association to each of the mayors-elect of the eighty-four cities of Ohio of over 5,000 population, asking them to name delegates to a municipal conference to be held in Columbus on January 24 and 25, 1912. The association has conferred with the mayors-elect of the first ten cities and each of them has approved the call and are taking a keen interest in the plans for the conference. The ten mayors are: Newton D. Baker, Cleveland; Henry T. Hunt, Cincinnati; George J. Karb, Columbus; Brand Whitlock, Toledo; Edward Phillips, Dayton; F. A. Hartenstein, Youngstown; Frank W. Rockwell, Akron; A. R. Turnbull, Canton; J. J. Miller, Springfield; Thad Stroub, Hamilton.

The intention is to hold the meeting during the early days of the convention, and if possible agree upon some recommendations to be addressed to the constitutional convention, expressing the opinion of the cities of the state on the provisions regarding cities which should be incorporated in the new constitution. The call contemplates the selection of 364 delegates distributed among the cities on the basis of population, ranging from three delegates from the smaller cities up to twelve for Toledo, fifteen for Cincinnati, and eighteen for Cleveland. In the letter accompanying the call, the association requests the mayors-elect to select their delegates partly from city officers and partly from citizens interested in civic affairs.

The conference will probably last two days. The first session in the afternoon, the second session in the evening, so that the members of the constitutional convention can attend. Two other sessions will be held on Thursday.

"The conference is to be absolutely nonpartisan," said Mayor Fesler, secretary, when speaking of the plans, "it is a meeting to consider the needs of the cities of the state, and to determine, if possible how cities can co-operate for their own welfare. A number of the states have 'Leagues of Municipalities,' and those leagues are a source of great help to the cities of the state. When we consider that more than 50 per cent of the population of Ohio now resides in cities, it would seem that they should have some voice in determining the provisions which are to be included in the new constitution."

The Municipal Association is the oldest civic organization in the State.

Albany Society of Civil Engineers.—At a meeting at Keeler's Hotel on Thursday night, December 21, A. B. Lueder, engineer of the Merrill-Ruckgaber Company of New York, who has been in charge of work for the American Bridge Company in British East Africa, read a paper on the "Erection of Bridges on the Uganda Railway, British East Africa." Mr. Lueder had over 100 lantern slides illustrating his African work.

American Society of Mechanical Engineers.—A meeting of the members residing in New York will be held in the Engineering Societies' Building, 29 West 39th street, January 9, at 8.15 p. m. The object of the meeting is to consider the work of the Society and its furtherance. The following addresses will be made: "Recent Activities of the Council and What They Effect," President Humphreys; "Activities of the Committee on Meetings," Charles E. Lucke; "Some Problems Before the Local Committee," F. A. Waldron; discussion; "Finances of the Society," R. M. Dixon; "The Problem of Membership," George J. Foran; "Publications," F. R. Low; "The Library," Leonard Waldo; "The Business of the House Committee," Edward Van Winkle; discussion.

New Hampshire Good Roads Congress.—The first road congress ever held in New Hampshire was called to order in Representatives' Hall at the State House, Concord, N. H., December 13, by Governor Robert P. Bass, who gave the opening address, outlining what had been done by the State for its highways during the first year of his administration.

Dr. John M. Gile, of Hanover, of the executive council, read a paper on "The Present Highway Law; Its Defects and Suggested Changes."

Charles W. Gates, highway commissioner of Vermont, described "The Construction of Vermont Roads," and Arthur W. Dean, formerly State Highway Engineer of New Hampshire and now chief engineer for the Massachusetts Highway Commission, compared the roads of New Hampshire and Massachusetts.

In the evening Paul D. Sargent, assistant director of the national office of public roads at Washington, gave an illustrated lecture on "The Fundamental Principles of Road Construction," and A. H. Blanchard of New York city gave an illustrated talk on "The Construction and Maintenance of Bituminous Surfaces and Bituminous Pavements."

Every county and a great majority of the cities and towns of the State have sent delegates to the congress.

In his address the Governor said in part:

"This meeting has been called to consider plans by which to develop New Hampshire through the medium of a system of improved highways.

"To supplement the State's fund for maintenance, I propose to submit before town meeting a request to every town in the State which has within its borders any of the trunk lines or State aid roads that they appropriate a certain given amount of money for the maintenance of those roads during the coming year. This has never been done up to the present time. It is the proper method to pursue, however, for by submitting such a request to each town for the appropriation of definite sum for State road maintenance in season for them to act upon it at town meeting, we shall go at the matter in a systematic, businesslike manner, and thereby provide a considerable additional sum for this important work.

"My program for the future is as follows:

"I propose in any case, whatever may be the nature of the forthcoming or any other report that I may call for, to strengthen materially my engineering staff, as I am convinced that the success or failure of our plan to give New Hampshire good roads hinges on the strength or weakness of this department.

"I am going to insist that proper and thorough investigations into all local conditions shall be made by our engineers before the type of road is selected for any section of highway. I propose to have the engineer see to it that our roads have under them proper foundations and to have him inaugurate a rigorously thorough system of supervision of all roads under construction, without exception. I shall require him to develop an equally thorough system of continuous and systematic maintenance.

"I intend that we shall profit by the experience of our sister States.

"I contemplate the engineer undertaking the construction of a map of our road system on which will be clearly shown the topography, drainage areas, and forests, and the opportunities existing for development of agricultural business and pleasure interests."

Calendar of Meetings

January 6.
Pacific Northwest Society of Engineers.—Annual Meeting, Seatle, Wash.—Joseph Jacobs, Secretary, 803 Central Bldg., Seattle, Wash.

January 8-13.
Association for Standardizing Paving Specifications.—Third Annual Meeting, Hotel Grunewald, New Orleans, La.—John B. Hittell, Secretary-Treasurer, 5917 Winthrop Ave., Chicago, Ill.

January 9.
American Society of Engineering Contractors.—Annual Meeting, New York City.—J. R. Wemlinger, Secretary, 13 Park Row, New York City.

January 9-11.
Michigan Engineering Society.—Annual Meeting, Lansing, Mich.—Alba L. Holmes, Secretary, 574 Wealthy Ave., Grand Rapids, Mich.

January 16.
Engineers' Society of Western Pennsylvania.—Annual Meeting, Pittsburgh, Pa.—Elmer K. Hiles, Secretary, 2811 Oliver Bldg., Pittsburgh, Pa.

January 16-18.
Wood Preservers' Association—Annual Convention, Chicago, Ill.—F. J. Augier, Secretary, Mount Royal Sta-

January 17-18.
American Society of Civil Engineers.—Annual Meeting, New York City.—Chas. Warren Hunt, Secretary, 220 W. 57th St., New York City.

January 17-19.
Illinois Society of Engineers and Surveyors.—Annual Meeting, Urbana, Ill.—E. E. R. Tratman, Secretary, 1138 Monadnock Blk., Chicago, Ill.

January 18-20.
Society of Automobile Engineers.—Annual Meeting, New York City.—Coker F. Clarkson, Secretary, 1451 Broadway, New York City.

January 23-25.
American Society of Heating and Ventilating Engineers.—Annual Meeting, New York City.—W. W. Macon, Secretary, 29 W. 39th St., New York City.

January 24-26.
Canadian Society of Civil Engineers.—Annual Meeting, Montreal, Que.—C. H. McLeod, Secretary, 413 Dorchester St., West Montreal, Que.

January 24-26.
Ohio Engineering Society.—Annual Meeting, Cleveland, O.—Clyde J. Kniseley, Secretary, New Philadelphia.

January 29-February 3, 1912.
Second Annual New York Cement Show—Madison Square Garden.—J. P. Beck, General Manager Cement Products Exhibition Co., 72 W. Adams St., Chicago, Ill.

February 14-15.
New England Association of Gas Engineers.—Annual Meeting, Boston, Mass.—N. W. Gifford, Secretary, 26 Central Sq., East Boston, Mass.

March 7-12.
International Brick and Clay Products Exposition—Coliseum. Chicago, Ill.—Office, 815 Chamber of Commerce Bldg., Chicago, Ill.

PERSONALS.

Cahill, John F., Troy, N. Y., the new Commissioner of Public Safety, has announced the appointment of Charles A. Goerold as Chief of Police.

Chadsey, Mildred, Miss, Cleveland, O., has been appointed Chief Sanitary Inspector of the Department of Health.

Cleary, Captain, Trenton, N. J., Chief of the Police Department for the last twelve years, resigned on account of poor health.

Desha, J. D., Nashville, Tenn., State Inspector of the Department of Health, has been spending several weeks in Chattanooga inspecting sanitary conditions.

Dority, E. K., Corbin, Ky., has been elected Chief of Police.

Gelhaus, W. J., Kenton, O., for fifteen years Chief of the Kenton Fire Department, has been appointed Chief of Police.

Hackett, George W., formerly City Engineer of Fulton, N. Y., has entered on his new duties as City Engineer of Utica, N. Y.

Hill, Wm. Millett, Salem, Mass., one of the city's oldest ex-Mayors, died at his home December 27 at the age of 81. He was City Marshal of Salem for a number of years, served in the city government and was Mayor of the city in 1883, 1884 and 1885.

King, Clifford Mitchell, Sandusky, O., has resigned as City Engineer and will be succeeded by former Deputy County Surveyor Robert S. J. Wagar.

O'Connell, Harry B., Newark, N. J., is to be elected President of Board of Works for the year 1912.

Parkhurst, Frederic S., Jr., has been reappointed City Engineer of Niagara Falls, N. Y.

Pierce, Herbert W., Rochester, N. Y., has been appointed Commissioner of Public Works. He has held the office of Fire Marshal for the past two years.

Sawtell, Wm., Roseville, Cal., Mayor of the city, was stricken with paralysis on December 18 while attending a meeting of the Town Trustees and died within a few hours.

Shanks, Mayor, Indianapolis, Ind., will be one of the principal speakers at a convention called by the State Department of Agriculture for January 17, 18 and 19 in Albany, N. Y., when the question of high food prices will be discussed.

Tynan, F. T., Mayor, Portsmouth, Va., head of the Police Department of Portsmouth, has been elected head of the Police Department Relief Association.

Tucker, Morgan J., Clinton, Ind., was elected by the City Council as Mayor of Clinton to fill out the unexpired term of M. M. Scott, resigned.

Vanberer, George, Middlesboro, Ky., has been elected Chief of Police.

Wooley, W. T., formerly City Engineer of Auburn, N. Y., has been appointed City Engineer of Schenectady, N. Y.

The following Mayors have been elected:

GEORGIA.

Clarkston—A. N. Barrett.
Thomasville—H. J. McIntyre.

FLORIDA.

Lake Helen—W. H. Gillette.

MASSACHUSETTS.

North Adams—Chas. S. Frink.
Lowell—James E. O'Donnell.
Lawrence—Michael A. Scanlon.

CALIFORNIA.

Santa Monica—Roscoe Dow.

MUNICIPAL APPLIANCES

Street Signs

The Matthews Interlocking Sign Company, White Plains, N. Y., manufacture street signs for which great durability is claimed because they are constructed entirely of galvanized and enameled iron, which is not affected injuriously by the action of the elements. Another reason for durability is the fact that the signs are fastened to the upright or holder and no bolts, screws or rivets are employed. In all other enameled street signs, except those placed inside an iron frame, there are four or more holes through which bolts, screws or rivets are passed to fasten the signs to the upright or holder. It is due to this manner of construction that enameled signs have often failed, as rust attaches to the sign at its fastening and spreads from that point rapidly.

All signs made by the Matthews Company are enameled on No. 18 gauge imported English iron. The enamel and the iron are said actually to unite. The failure of signs made with domestic iron is due to the failure of iron and enamel to unite. The Matthews signs are artistic in design and pleasing in general appearance. They present a clean, clear face, free from bolts or screw holes or end clamps. It is claimed that the sign does not become dull, but stands out as clearly after years of use as when made.

The little sign in the center of the illustration is for use where there is no electric light on telegraph pole available. The standard furnished is of heavy galvanized iron pipe eleven feet long and is designed to set three feet in the ground, the underground portion being heavily coated with waterproof paint. Setting in concrete is advised, as the extra cost is slight and added stability is very great. The standard may be of 2-inch pipe throughout, or seven feet may be 2-in. and four feet 1¼-in.

The sign on the right in the illustration is a very good one where there is a pole. This sign can be read 24 hours in every day. It is out of the way and not liable to accident from sidewalk or street traffic. It is cheaper in first cost and in cost of setting and can be used on fully 75 per cent. of the corners in most cities. The names and castings are heavy and when in position will sustain a weight of 200 pounds.

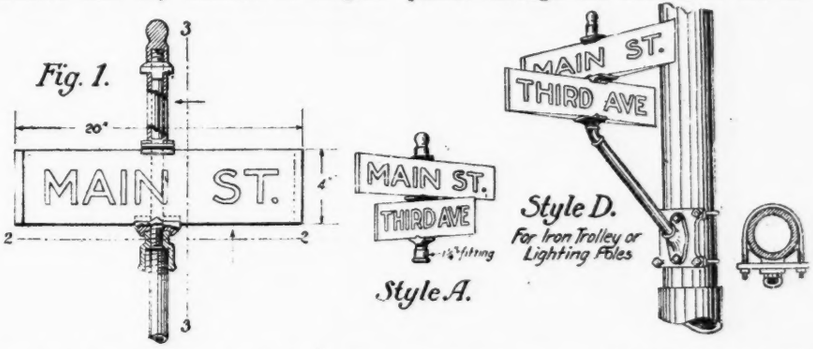
Blaw Sidewalk Forms

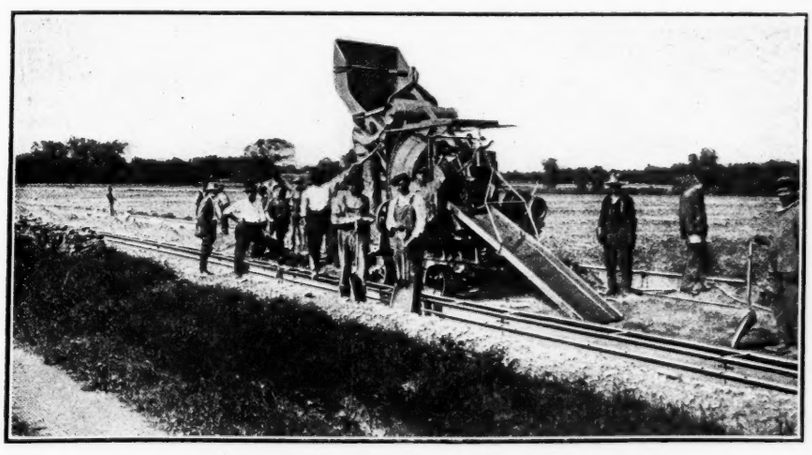
The accompanying illustration is from a photograph of an extensive piece of concrete sidewalk construction where Blaw forms were used. The concrete mixer is, of course, the prominent feature in the view, and rightly so, for without steel forms that can be readily set up and used over and over again so large a mixing plant could hardly be used. The cost of lumber and the labor would be out of all proportion if wood were being used entirely for forms.

Blaw sidewalk forms are easily and quickly set up. It is claimed that they can be taken away and moved forward to their new position in about one-tenth the time and about one-tenth the labor required with the old method of wooden forms. They are built entirely of steel. For side rails pressed steel channels are used. These channels are built in 10-foot lengths, so constructed that any number of lengths may be joined together to form a continuous rail. The rails are built in 4-inch, 5-inch and 6-inch heights, according to the thickness of the walk to be constructed.

The rails are slotted every 12 inches so that the steel dividing plates may be inserted to make any length of block required. These dividing plates insure correct expansion joints, and are dropped into the slots on the side rails and held rigid by means of a wood wedge on the outside of the side rails. These dividing plates are made in any height and any width. The dividing plates can be removed independent of the side rails and vice versa. Immediately after the concrete has been placed and has begun to set the dividing plates can be removed to the forms ahead. This allows free and unhampered refinishing, and requires a fewer number of dividing plates.

Different widths of walks may be constructed with the same forms by merely purchasing dividing plates of the proper width. In case the contractor wants to use the same side rails on different heights of sidewalks, the bottom flange of the rails is punched to receive screws for attaching wood strips to increase the height.



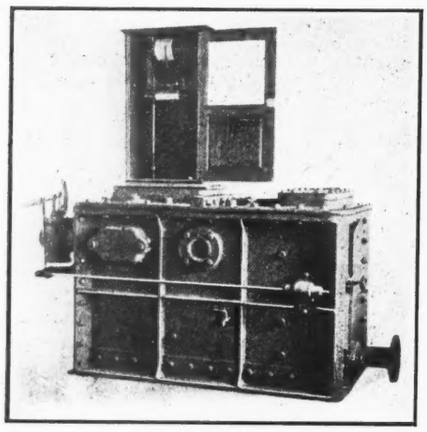


LAYING CONCRETE SIDEWALK WITH BLAW FORMS.

V Notch Water Meter Pressure Type

The Yarnall-Waring Company, No. 1109 Locust street, Philadelphia, Pa., manufacturers of the Lea meter for measuring and recording the flow of water, have placed on the market a new type, designed to operate under pressure. The atmospheric type was described in the MUNICIPAL JOURNAL, June 28, 1911. A brief review of the principle and operation of the device applicable to both types is as follows: A float spindle having a rack cut upon it passes through the bottom of the instrument case. This float spindle which can be seen at the left of the upper portion of the cut connects with a drum shown at about the center of the same portion of this engraving by a small pinion mounted upon the drum axis. This drum revolves between centers and upon its body is a modified helix, the pitch of which is the curve of flow of the V notch used in the recorder. The pitch of this helix increases in the same proportion that the flow through the notch increases with the depth. A horizontal slider bar supported on small pivoted rollers is mounted above this drum and carries an arm. There is a pen or pencil point at the upper end of this arm making contact with a paper chart mounted upon a clock-driven recording drum which makes one complete revolution in 24 hours. The spiral on the drum is rotated as the float in the recorder rises or falls and this motion is imparted to the recording mechanism by the saddle arm projecting from the slider bar and engaging with the screw thread at its lower end. Adjacent to the screw thread on the body of the spiral drum is a graduated scale, the divisions of which read in pounds per hour. A double purpose is served by the spiral drum as the screw thread rectifies the motion of the pen and causes it to move equal distances for equal increments in the rate of flow, while at the same time it provides a magnified scale for making accurate observations of the rate of flow at any moment.

The pressure type is operated by the pressure of water in the system. It has a tank made of cast iron similar to the standard open heater construction.



LEA WATER METER.

This construction, when used in measuring boiler feed water, enables the recorder to be placed between the open feed water heater and the feed pump, and as the pressure to the recorder is the same as that in the heater, there is no loss of temperature in the feed water during its passage from the heater to the pump. As the recorder will stand any pressure or vacuum up to 10 pounds and the operating head is only 18 inches, the device can be installed without any great changes in the piping. A balanced float valve is placed on the inlet at the left end of the tank. This is operated by a float and lever mechanism placed below the wire on the discharge side. At the opposite or right end of the tank the water gage is located so that the operation of the pump mechanism can be checked at all times. Two glass peep holes located at the side of the tank provide means of adjusting the recorder to zero while the notch tank is under pressure. This pressure recorder is made in sizes varying from 200 to 10,000 boiler horse power.

When the flow to be measured is so small that it would show only a depth of but 1 or 2 in. in a 90-deg. V notch, other notches having smaller angles can be employed. As the flow through these notches is approximately proportional to their width for a given depth it is possible to obtain a large float movement while only a small quantity of water is being measured and thus reduce any errors due to incorrect setting of the instrument to a minimum. Another method of measurement is to supply one recorder with a series of multiple V notches for measuring large and small quantities. When this is done any number of notches can be used, the spiral drum having a capacity equal to the maximum flow through one notch. Different numbers of notches are opened according to the amount of flow to secure a practically uniform movement of the float.

These recorders are said to produce records which are accurate within 1½ per cent. by weight and in addition they are also guaranteed by the maker to have an average error of not more than ½ per cent., due to variations in temperature over a range of 25 deg. on either side of the normal operating figure.

Priestman Ejector

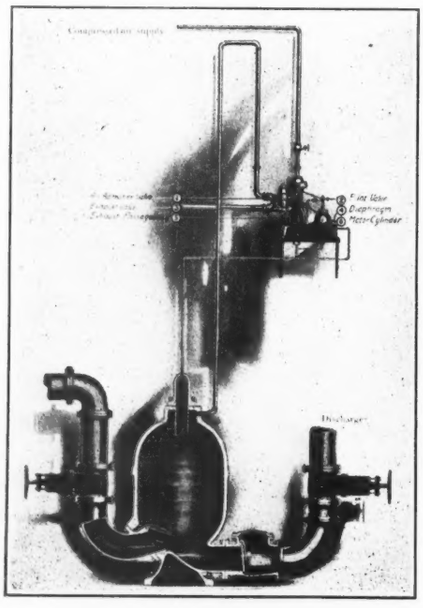
Merritt & Co., Front st., Camden, N. J., manufacture the Priestman ejector, a device using compressed air for lifting crude sewage to a higher level. It has no actuating mechanism or machined surface in contact with solids, acid, grease, grit, etc., of which the sewage is composed. It is applicable whenever the sewage for building, district or city cannot be carried by gravity alone to the point of discharge.

Applied to general sewage collection systems it is possible to save heavy outlays for deep cuts. When a small part for sewer system is on a low level, the employment of a Priestman ejector will frequently obviate the cost of providing an expensive pumping station for handling the entire volume. It is claimed that the ejectors have operated efficiently for upwards of thirty years.

As applied to sewage treatment plants, the ejector may be used to elevate the sewage to a height as to permit steady gravity flow to other parts of the plant. It is claimed that considerable saving may be effected in the size and cost of the tanks where the ejector is used. No collection well is required because the number of discharges from the ejector is in precise relation to the volume of sewage to be handled from minute to minute. The operating air acts to retard putrefaction and aids the process of purification. The ejector will also handle sludge.

Briefly, in the Priestman ejector, crude, unscreened sewage, or other liquid, is ejected by compressed air, automatically admitted when the ejector is full, automatically cut off and allowed to expand, while the sewage is discharged.

Sewage gravitates into the ejector through a check valve and in doing so expels the air contents of the ejector through the exhaust pipe to atmosphere. When the sewage has risen about twelve inches above the mouth of the air bell in the ejector, the pressure of air in this bell, transmitted to the under side of diaphragm (4), lifts it about one-eighth of an inch and opens pilot valve (2), permitting a small quantity of air to pass from the air-supply main into the motor cylinder (6). This cylinder being of larger diameter than the air-admission valve (1), the motor piston rises, closing the exhaust passageway (5), and then opening valve (1), which admits air to the ejector. Air pressure also passes to the upper side of the diaphragm, closing pilot valve (2), and the exhaust valve is closed, the air pressure being exerted on the motor piston of that valve. The air is admitted to the ejector for a predetermined interval of time, which is adjusted to afford the highest working efficiency in each installation. The air within the ejector expands and continues to displace the sewage contents until the pressure is reduced to less than that required to hold exhaust valve (3) to its seat. This valve thereupon opens, permitting the air to exhaust and the ejector to refill.

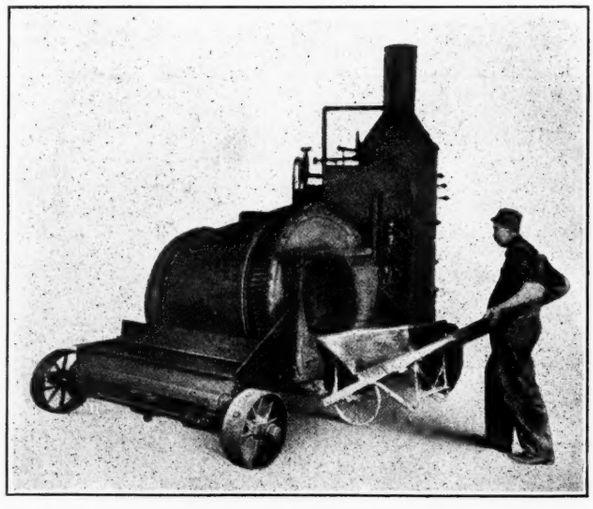


PRIESTMAN SEWAGE EJECTOR.

Whirlpool Concrete Mixer

The Whirlpool Mixer and Machinery Co., 222 Grand Avenue, Milwaukee, Wis., manufacture a concrete mixer, the principal characteristic of which is that it can be easily charged from wheelbarrows on one side and that it discharges into a wheelbarrow on the other. Concrete mixers have been made for so many years and tried so thoroughly that it seems impossible that any new design of value could be devised. The extent and variety of concrete construction is such, however, that machines are brought out every now and then having special merits for work to be carried on in some particular way. The Whirlpool mixer apparently supplies one of the requirements of loading and discharging.

In general the construction of this mixer is simple, substantial and compact. The cone shaped drum is the principal feature which differentiates it from the ordinary type of drum mixers. The charging opening is large and no scaffolding is necessary. The discharge is comparatively high, either continuous or in small batches as desired. The name of the machine is derived from the peculiar whirling movement given to the concrete due to the shape of the drum and the mixing blades.



WHIRLPOOL CONCRETE MIXER.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago: Improvement in the trade is noted. Quotations: 4-inch, $26.50; 6 to 12-inch, $24.50; 16-inch and up, $24. Birmingham: All local plants were closed for the holidays. There are orders enough on hand to warrant a steady output for 30 or 60 days. Quotations: 4 to 6-inch, $23; 8 to 12-inch, $22; over 12-inch, average, $21; special fittings, $45. New York: No developments of importance have occurred. Quotations: 6-inch, car loads, $22 to $23.

Lead.—Market is dull. Quotations: New York, 4.45c; St. Louis, 4.35c.

Stone Crushers.—Consul E. A. Wakefield, Port Elizabeth, Cape Colony, writes that there is a fair demand for stone-crushing outfits from municipalities and also from districts outside municipal areas of jurisdiction. For local administrative purposes the country is divided into sections known as divisional districts. Each district has a board of councilors with jurisdiction over district matters, including the establishment and maintenance of highways.

The machines now in use are employed almost exclusively in crushing stone for local road work within municipal and divisional council areas. The Port Elizabeth municipality has six stone crushers, size 16 by 9 inches, made by an English firm and costing $1,874 each, delivered in Port Elizabeth. This machine is the one principally in use throughout this consular district. Extra jaws for these machines are stocked by a local firm.

Unless personally represented in South Africa, communication with municipal and divisional council officials (a list of whom is obtainable from the Bureau of Manufactures) is the best method of placing the advantages of stone-crushing machines before these bodies.

Tires for Fire Apparatus.—Among the features of interest to fire department officials attending the big automobile shows this winter will be the exhibit of Firestone dual pneumatic tires and quick detachable demountable rims. The tires are constructed specially for this class of work and where one is punctured its mate will carry a load safely and quickly to its destination. The Firestone Quick-detachable Demountable Rim possesses many points of interest. Aside from the fact that it requires but the loosening and tightening again of a few nuts to change a punctured tire for a spare one already inflated, its quick-detachable feature is of greatest importance, it being possible to change tires with the rim on or off the wheel as the operator may choose. No rim tools are used. An ordinary wrench will do to demount the rim and a common screw-driver to detach a tire.

A non-skid tire will be shown which has a unique heavy raised lettered tread of tough rubber, making it nearly double the thickness of an ordinary smooth tread casing. The peculiar arrangemeint of this lettering presents countless sharp edges and angles to the road and the hollows of the letters create vacuums against the paving, combining two well-known principles of skid preventing.

This tire, as are all other Firestones, with the exception of the regular clincher pattern, is furnished with a floating flap.

Bitulithic Pavement 1911 Development.—Warren Brothers' Company report December 20, 1911, as the banner day during its eleven years development in the volume of Bitulithic contracts awarded covering the widest range of climatic conditions of the United States and Canada, and comprising the following:

	Sq. yds.
Los Angeles, Wilshire Blvd.	76,000
Edmonton, Alb.	80,000
Strathcona, Alb.	80,000
Jackson, Miss.	33,301
Schenectady, N. Y.	13,700

The company reports during the year 1911 Bithulithic pavements contracted for and awarded for carrying over for construction during the year 1912, 125 cities, 6,034,594 square yards, bringing the total area of bitulithic pavements laid and contracted for during the 11 years of its existence up to 19,678,519 square yards, covering an equivalent to 1,118 miles of roadway having a width of 30 feet between curbs.

Water Meters.—The Thomson Meter Co., Brooklyn, N. Y., is sending out a folder containing an article by George Houston, water commissioner, Kalamazoo, Mich., entitled, "Are Water Meters Advantageous or Otherwise?" The main point of the article is contained in the following paragraph:

During the year ending March 31, 1911, with a population of upwards of 40,000, and with something over 5,300 services and a revenue from water of over $38,000, we pumped a total of 710,474,683 gallons of water, as against 787,621,902 gallons pumped in 1893, with a population of about 18,000, and with only about 2,500 services and a revenue of only $15,262.37, which permits the following deduction: With a population considerably more than double and with more than twice as many services, and with rates lowered more than 10 per cent, we increased our revenue over 150 per cent, and decreased the amount of water pumped 77,000,000 gallons. All this was accomplished by the enforced use of meters, and how any municipality that is struggling with the question of an inadequate supply of water will ignore the benefits they might derive from a complete metering of the plant and continue to pay out the citizens' hard earned money, contributed yearly in the way of taxes, to get an increased supply of water in order that the wasteful may have more to waste, when all they have to do is to properly care for what they have, is too deep a mystery to be fathomed by the writer.

General Electric Bulletins.—Among the recent bulletins published by the General Electric Company, Schenectady, N. Y., are two very attractive ones, handsomely illustrated. One is the 1912 catalogue of electric fans, the others treat of the lighting of hotels, cafes and clubs.

Bulletin 4902 contains a list of direct current switchboards of 125 and 250 volts for controlling 3-wire generators up to 200 kw capacity, and 2-wire or 3-wire feeder current up to 1,200 amperes. Bulletin 4912 deals with ozonators, electric devices for producing ozone for the purpose of improving the atmosphere of buildings not easily supplied with a sufficient quantity of fresh air, a class which practically includes all public buildings. Besides describing the device the bulletin states at considerable length the theory of ventilation and ozonation jars.

Paving Contractors' Association.—An organization of the paving men of the South and Southwest was effected at a meeting of those interested, held at Birmingham, Ala., at the Hillman hotel on November 27. The call for the meeting was signed by Eugene Fies, president and treasurer of the Southern Asphalt and Construction Company; G. M. Ingram, president of the Southern Bitulithic Company; J. R. Copeland, of the Alabama Paving Company; T. H. Lasley, of the Southern Paving Construction Company, Chattanooga, Tenn.; W. E. McGehee, secretary and treasurer of the Memphis Asphalt and Paving Company; R. D. Farmer, general manager of the Western Paving Company, and M. D. Cook, contractor.

New Auto Pumping Engine.—The first pump built by the Rochester Motor Fire Pump Company has been completed and is on exhibition at the plant of the W. A. Wilson Machine Company in North Water street. A two-day test proved entirely satisfactory, and it is planned to mount the pump on an automobile chassis within the fortnight, when further tests will be made. During the test a stream of water was discharged at the rate of 700 gallons a minute, and it is expected that by speeding up the pumps a capacity of 1,000 gallons a minute can be developed. The pumping mechanism weighs slightly more than 2,000 pounds, and the weight of the entire machine, mounted ready to proceed to a fire, will be about 4,800 pounds. The president of the new corporation, which has a capitalization of $150,000, is R. S. McMahon. The pump was evolved from ideas of Louis Fuchs, secretary of the company.

Remodeled Engine Shipped.—Commissioner Frank L. Cogill, Bridgeport, Conn., reported that the Nott Fire Engine Company, Minneapolis, Minn., had shipped the renovated No. 1 steamer the 22d of last month and that the modern piece of apparatus can be expected at any day. He reported that the keys of the steamer were received by mail. This steamer is the most modern and powerful in the department and was shipped to Minneapolis in July to be changed over into a motor-driven machine. The old carriage has been done away with and a powerful chassis substituted. Gasoline will be used to propel it, but its steam engine will run the pumps. Delays are responsible for the machine being kept so long, it having been expected that it would be received last fall.

Pumps.—The Goulds Manufacturing Company, Seneca Falls, N. Y., has just issued bulletin No. 106, describing the Goulds vacuum and stuff pumps. It is well illustrated and gives complete details of the different sizes in which these pumps are made.

Pumps.—The Deane Steam Pump Company, Holyoke, Mass., in a new bulletin, D-205, gives an extensive discussion of the construction of its triplex power pumps of the vertical, double-acting type. Some nine different styles of these pumps are illustrated and tables of dimensions, capacities, etc., are given of each. The pumps are arranged for belt or gear drive from any power source.

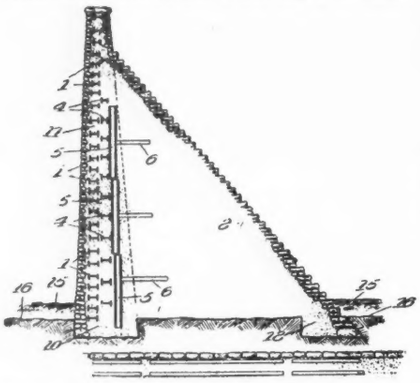
Meters.—The Neptune Meter Company has sent a New Year's card to its friends saying: "Here's that a full and steady stream of prosperity under high pressure may flow your way unmetered during 1912."

Meter Boxes.—The H. W. Clark Company, manufacturers of Clark meter boxes, have sent an attractive New Year's card to their friends.

PATENT CLAIMS

1,012,750. DAM. Frank Stone Tainter, Far Hills, N. J., assignor to Power Development Company, Hoboken, N. J., a Corporation of New Jersey. Serial No. 557,897.

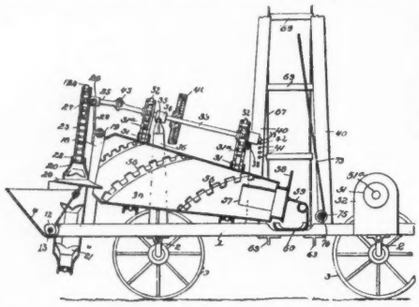
In a structure of the character described, the combination with a steel frame arranged to carry the loads in com-



pression, of a masonry curtain wall for said frame, said wall inclosing, protecting and supporting the elements of said frame.

1,012,729. CONCRETE-MIXER. Isaac K. Shero, Okemah, Okla. Serial No. 593,912.

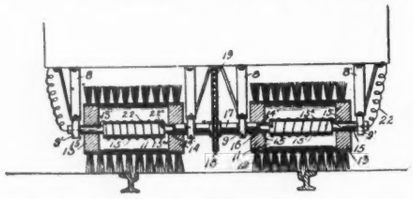
In a concrete mixing machine, a supporting frame including vertical standards, a bearing carried by said standards and swinging vertically thereon, a shaft mounted intermediate its ends in said bearing, chain wheels carried by said



shaft at opposite sides of said bearing, a mixing drum, chains engaging the chain wheels and extending around the mixing drum, and means for vertically adjusting said shaft to cause it to swing with said bearings.

1,012,904. STREET AND RAILROAD SNOW-SWEEPER. Arthur A. Owen and Samuel B. Musgrave, Springfield, Mo. Serial No. 588,760.

In a street and railroad snow sweeper, a car body, brackets extending therefrom, bearings associated with the brackets, shafts seated in the bearings, the said shafts having openings in their ends, conductors extending through the said open-



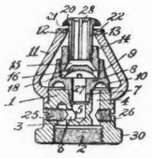
ings, rotatable cylinders on the shafts, bristles carried by the brushes which comprise cylinders, conductors of electricity extending through the openings of the shafts, resistance elements in the cylinders connected to the conductors, and means for rotating the cylinders.

1,011,918. FLUID-PRESSURE GOVERNOR. Herbert W. Cheney, Milwaukee, Wis., assignor to Allis-Chalmers Company, a Corporation of New Jersey. Serial No. 486,239.

In a governor for a fluid compressor, a plunger shifted inward or outward by variations in fluid pressure, a switch including a switch lever responsive to the action of said plunger, a pair of springs, one stressed when the plunger is moved in one direction and the other stressed when the plunger is moved in the opposite direction, means for holding said switch lever against movement during certain ranges of fluid pressure, and means including a cam member operated by said plunger after a predetermined movement thereof for releasing the lever so that it can be shifted by one of said springs.

1,013,043. SANITARY DRINKING-FOUNTAIN. Philip Mueller and Anton C. Schuermann, Decatur, Ill., assignors to H. Mueller Manufacturing Company, Decatur, Ill., a Corporation of Illinois. Serial No. 617,476.

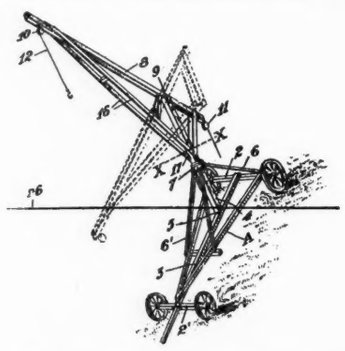
A drinking fountain having a nozzle provided with two independent water passageways therein, an adjustable nipple having a flaring head and a central opening, means connecting said nipple with one of said passageways, through which water from the said passageway may pass only to the nipple to form the drinking



stream, and an encircling shell surrounding the lower end of said nipple and the connecting means having an opening in its upper end slightly larger than said nipple and encircling the same, forming thereby an annular outlet for the water passing through the second independent passageway and through said shell around the nipple connecting means to forms an encircling sheet below the head of the nipple.

1,012,921. PORTABLE DERRICK. Theodore G. Schmeiser, Davis, Cal. Serial No. 635,833.

In a portable derrick having a mast, a triangular boom pivoted intermediate its ends on the mast to swing in a vertical plane, said boom divided longitudinally and disposed astride the mast, and means



for temporarily locking the boom against movement in relation to the mast, said means consisting of a pair of wedge-shaped locking lugs mounted on said boom and adapted to engage the mast.

1,012,661. REMOVABLE HANDLE FOR SHOVELS. James S. Lattimore, Redding, Cal. Serial No. 624,259.

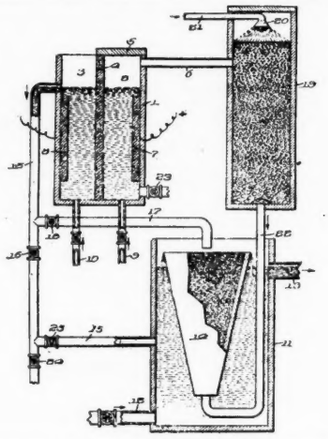
In combination, a shovel having an elongated compound curved extension semi-circular in cross section, and also provided with a short extension, a plate corresponding in shape to the elongated extension, between which and the curved extension a compound curved portion of a handle is arranged, means penetrating the handle and the plate and the curved extension for connecting them in position, the plate being arranged adjacent the short extension, and means for holding the plate adjacent and connected to the short extension.

1,012,859. CULVERT. James B. Jarmin, Spokane, Wash. Serial No. 645,049.

In a metal culvert, a lower section extended outwardly adjacent its upper end to define a shoulder, and to define a flange above the shoulder; a strip secured to the inner face of the lower section, below the shoulder, upstanding above the shoulder; and an upper section inserted between the flange and the strip.

1,012,809. APPARATUS FOR PURIFYING WATER. William B. Bull, Chicago, Ill., assignor to Chloride Process Company, Chicago, Ill., a Corporation of Illinois. Serial No. 626,310.

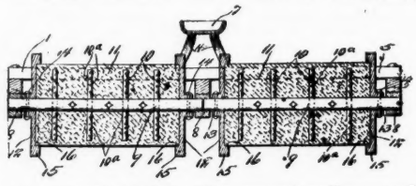
An apparatus for purifying water, comprising means for generating a gaseous product containing chlorin, separate means for impregnating water with such gaseous product, a receptacle adapted to contain iron, means for conducting the



impregnated water through the iron to said receptacle, and a container for the water to be purified arranged to receive the product formed in said iron-containing receptacle.

1,012,612. CONCRETE LAND-ROLLER. Joseph M. Da Vier, Disco, Ill. Serial No. 643,407.

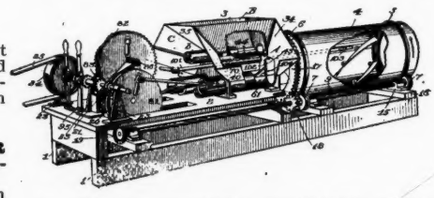
In combination, a frame, cement rollers journaled in bearings thereof, the rollers having metallic cores having radiating



arms embedded in the cement rollers, and annular plates secured to the cores and arranged closely in contact with the ends of the cement rollers, the annular plates being radially extended, to form annular extension flanges.

1,012,808. METHOD OF PURIFYING WATER. William B. Bull, Chicago, Ill., assignor to Chloride Process Company, Chicago, Ill., a Corporation of Illinois. Serial No. 616,731.

The method of purifying water, comprising electrolyzing a saline solution by the use of an inert anode to form a gaseous product containing chlorin, conducting the gas from the anode chamber to



an exterior receptacle containing water, impregnating the water with said gas, subjecting iron to the action thereof to form a coagulating agent, and treating the water to be purified with such coagulating agent.

1,012,915. FEED-REGULATOR FOR MIXING-MACHINES. John N. Rauber, Rochester, and Samuel Finley, Geneseo, N. Y.; said Finley assignor to said Rauber. Serial No. 364,285.

In a mixing machine, the combination with a plurality of hoppers, reciprocating pistons in said hoppers adapted to move in parallel lines for discharging given quantities of material therefrom, of driving mechanism for imparting a differential movement to said pistons simultaneously and adjustable connections between said mechanism and said pistons for varying their relative movements to control the quantities of material discharged from the several hoppers.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK.	ADDRESS INQUIRIES TO
			STREET IMPROVEMENTS	
Alabama	Brewton	Jan. 5	Constrn. 9 miles sand and clay roads	County Commissioners.
Connecticut	Hartford	Jan. 5, 2 p.m.	Constrn. gravel roads	J. H. Macdonald, State High. Comm.
Ohio	Cincinnati	Jan. 5, noon	Paving roadway & approaches of viaduct with wood block	Director of Public Service.
Ohio	Cincinnati	Jan. 5, noon	Paving viaduct with wooden blocks	Director of Public Service.
Ohio	Rocky River	Jan. 5, noon	Constrn. cement walk	W. M. Dean, Village Clerk.
Wisconsin	Kenosha	Jan. 5	Constrn. 8,000 yds. brick pavement, sand stone curb and asphalt filler. Cost, $17,000	August Baltzer, City Eng.
Minnesota	Winona	Jan. 5, noon	Constructing 20 miles macadam road	Jos. Winczewski, County Auditor.
Indiana	Lebanon	Jan. 8	Constrn. bituminous concrete road, 34 ft. wide, 3,300 lineal feet long with cement curb and gutter	City Clerk.
California	Azusa	Jan. 8, 7.30 p.m.	Constrn. sidewalks, curbs and gutters	G. E. Glover, Clerk.
Mississippi	Magnolia	Jan. 8	Constructing concrete sidewalk	City Council.
Iowa	Carson	Jan. 9, noon	Constructing roads during 1912	F. Weeks, Township.
Indiana	Michigan City	Jan. 9	Constrn. 7,000 sq. yds. brick asphalt cresote block and asphalt macadam pavement	E. J. Heise, City Clerk.
Pennsylvania	Pittsburg	Jan. 9, noon	Paving approaches to bridge	R. G. Cunningham, County Compt.
Alabama	Anniston	Jan. 10	Constrn. 4 miles chert or limestone road	County Commissioners.
Mississippi	Vicksburg	Jan. 12, 8 p.m.	Paving Bowmar avenue & constrn. gravel & tar roadway	J. J. Hayes, Mayor.
Florida	DeFuniak Springs	Jan. 15, noon	Constrn. 60 miles sand and clay roads	County Commissioners.
New York	White Plains	Jan. 15	Constrn. concrete sidewalk and stone curb	J. J. Brown, Village President.
New Jersey	Jersey City	Jan. 15, 2 p.m.	Repaving Summit avenue with wood blocks	E. B. See, Clerk Bd. Comm.
Michigan	Muskegon	Jan. 15, 8 p.m.	Constrn. 4,956 sq. yds. tarvia bitum. macadam or sim pave	B. H. Tellman, City Recorder.
Ohio	London	Jan. 16	Pav'g 2,800 sq. yds. with brick, asphalt or creosoted block	City Clerk.
Ohio	Cleveland	Jan. 17, 11 a.m.	Improving Union road	County Comm.
Ohio	Cleveland	Jan. 17, 11 a.m.	Grading, draining and improving road	County Commissioners.
Indiana	La Porte	Jan. 18, 10 a.m.	Constrn. 15 miles macadamized roads	F. A. Hausheer, County Aud.
Indiana	Evansville	Jan. 18, 10 a.m.	Furnishing broken stone and gravel	Board of Turnpike Directors.
Indiana	Portland	Jan. 18, 10 a.m.	Improving highway in Richmond township	W. L. Smith, County Auditor.
Ohio	Cincinnati	Jan. 19, noon	Repairing Forest avenue	Stanley Strubel, County Comm.
New Jersey	Montclair	Jan. 22, 8 p.m.	Constructing granite block pavement on concrete foundation, about 34,300 yds.; also 13,700 ft. of curbing	Harry Trippett, Town Clerk.
Iowa	Carroll	Jan. 24, 8 p.m.	Improving a number of streets	J. A Dougherty, City Clerk.
Indiana	Indianapolis	Jan. 25	Constrn. 2 miles macadam road	A. Sam, County Auditor.
Indiana	Indianapolis	Jan. 25	Constrn. road 2 miles long; cost, $8,500	Thomas, Marion & Hendricks Co.
Indiana	Bluffton	Jan. 31, 11 a.m.	Constrn. gravel road	County Comm.
Illinois	Rockville	Feb. 1	Constrn. 30,000 sq. yds. brick pavement on concrete base; cost, $60,000	Aetna Eng. Bureau, Engr., Chicago.
Tennessee	Johnson City	Feb. 1, 7 p.m.	Constructing street pavements and other improvements	City Council.
Chile	Santiago	Mar. 10, 10 a.m.	Constrn. 70,000 meters asphalt pavement	City of Santiago.
			SEWERAGE	
Ohio	Toledo	Jan. 5, noon	Constrn. local sewers	F. G. Stockton, Sec. & Dir. Pub. Ser.
Alabama	Mobile	Jan. 5, noon	Constr. 22,000 ft. clay pipe & concr. sewers, 6½ ft. in diam.	Board of Comm
Ohio	Cincinnati	Jan. 5, noon	Constrn. main and lateral sewers	Director of Public Service.
Missouri	Cameron	Jan. 5, 8.30 p.m.	Constrn. 12,280 ft. 8-in. sewer and appurtenances	Clarence Staples, City Clerk.
Ohio	Cincinnati	Jan. 5	Constrn. main and lateral sewers	J. J. Wenner, Clerk Dir. Pub. Serv.
Indiana	Indianapolis	Jan. 8, 10 a.m.	Constrn. local sewers and appurtenances	C. H. Schrader, President.
California	Ft. Winf'd Scott	Jan. 8	Extending sewer system	Constrn. Quartermaster.
Indiana	Columbus	Jan. 9	Constrn. sewer system. Cost, $40,000	City Council.
Indiana	Fort Wayne	Jan. 11, 7.30 p.m.	Constructing local sewers	F. T. Benoy, Chm. Bd. Pub. Wks.
Indiana	Williamsport	Jan. 15, 8 p.m.	Constrn. 1,579 ft. 4-in. sewer pipe	Town Board.
Indiana	Williamsport	Jan. 15, 8 p.m.	Constrn. about 6,500 ft. 4 to 18-in. sewer pipe	Rufus Haput, Pres. Bd. of Trustees.
Mississippi	Vicksburg	Jan. 12, 8 p.m.	Constrn. storm sewers	J. J. Hayes, Mayor.
Kansas	Fort Scott	Jan. 20	Constrn. clay pipe sewers; cost, $115,000	G. M. Sanford, City Clerk.
Iowa	Fort Dodge	Jan. 29	Constrn. sanitary sewer	City Council.
Missouri	Hannibal	Feb. 1	Constrn. vitr. pipe and concrete sewers; cost, $30,000	B. F. Smiley, City Engineer.
Ohio	Canton	Feb. 1	Constrn. 1½ miles sanitary sewer	P. H. Webber, City Engineer.
Tennessee	Johnson City	Feb. 1, 7 p.m.	Constrn. 1,600 ft. pipe sewers	P. F. McDonald, City Comm.
			WATER SUPPLY	
Michigan	Grand Rapids	Jan. 4, 8 p.m.	Furn. gate valves	E. H. Christ, Pres. Bd. Pub. Works.
Ohio	Youngstown	Jan. 4	Furn. 700 tons C. I. pipe, 30 tons specials, 80 hydrants, 150 gate valves, 1,000 water meters, 250 valve boxes, etc.	Dir. Pub. Serv.
New York	New York	Jan. 5, 2 p.m.	Laying water mains	H. S. Thompson, Comm. Water Sup.
New York	New York	Jan. 5, 2 p.m.	Furn., deliver and laying water mains and appurtenances	Comm. Water Supply, Gas and Elec.
S. Dakota	Bellefourche	Jan. 8	Drilling and casing an artesian well	C. P. Seward, City Auditor.
Illinois	Melrose Park	Jan. 8, 8 p.m.	Sinking artesian well 1,600 ft. deep	John Engbrecht, City Clerk.
New York	New York	Jan. 8, 2 p.m.	Hauling and laying water mains and appurtenances	Comm. Water Supply, Gas and Elec.
Oklahoma	Muskogee	Jan. 9, 10 a.m.	Furn. condenser, 2,100 lbs. steam per hour capacity	E. H. Fleming, Commissioner.
Pennsylvania	Erie	Jan. 12, noon	Constructing standpipe and foundations	Comm. of Water Works.
Oklahoma	Kingfisher	Jan. 15 (about)	Extend'g electric light system and installing water works	W. L. Benham, Engineer, Okla.
Oregon	Newberg	Jan. 15	Furn. internal combustion engine or motor, turbine pump and 10-in. supply main	Mayor.
No. Carolina	Albemarle	Jan 16	Constr. pumping station with 2 motor-driven turbine pumps; also 6 to 10 miles pipe line	M. J. Harris, Mayor.
Illinois	Danville	Jan. 18, 10 a.m.	Furn. wrought iron pipe and fittings	W. L. Kelley, Treasurer.
Pennsylvania	Philadelphia	Date not stated	Hauling and laying 24,000 ft. 24-in. wood pipe and 28,500 ft. 16-in. C. I. pipe; constrn. earth dam	Boyce Ficklen, Jr., City Clerk.
Georgia	Washington	Jan. 22, noon, re-ad.	Constrn. addition to water works plant	American Pipe & Construction Co.
Michigan	Grand Rapids	Jan. 25	Furn. 375 H.P. water tube boiler	E. H. Christ, Pres. Bd. Pub. Wks.
Georgia	Macon	Jan. 25	Furn. C. I. water pipe, cost about $80,000	Water Commissioners.
Spain	Bilbao	Feb. 1, noon	Filtering and sterilizing the water supply	Secretaria del Excmo.
Oklahoma	Wagoner	Feb. 1 (about)	Extend'g electric light system and installing water works	W. L. Benham, Engineer, Okla.

BIDS ASKED FOR

State	City	Received Until	Nature of Work	Address Inquiries to
			LIGHTING AND POWER	
California....	Roseville.....	Jan. 8, 7.30 p.m....	Furn. electrical energy for 5 years.....	J. H. Stineman, Clerk of Board.
Nebraska.....	Stanton.....	Jan. 8.....	Installing electric generator and 100-h.p. steam engine....	City Council.
Iowa.....	Corydon.....	Jan. 9, 8 p.m.....	Improving electric light plant.....	J. J. C. Bower, Town Clerk.
Arkansas.....	Clarksville.....	Jan. 19.....	Constructing electric light system.....	F. W. Dunlap, Sec'y Bd. Imp.
Georgia.....	Washington.....	Jan. 22.....	Constrn. electric light plant (readvertisement).....	Boyce Ficklen, Jr., City Clerk.
Georgia.....	Washington.....	Jan. 22, noon.....	Overhauling and extending electric light power transmission system.....	Boyce Ficklen, Jr., City Clerk
Massachusetts.	Boston.....	Jan. 24.....	Furnishing 11,000 gas mantel lamps.....	J. E. Mullen, Supt. Dept. Sup.
California.....	Los Angeles.....	Jan. 25.....	Furn. power plant, piping, etc., for county hospital.....	Board of Supervisors.
Dist. Columbia.	Washington.....	Jan. 27, 11 a.m....	Furn. 2 electrically-driven capstans.....	R. C. Holliday, Chief Bur. Yds. and Docks, Navy Department
			FIRE EQUIPMENT	
Missouri.....	Tarkio.....	Jan. 8, 8 p.m.....	Bldg. fire engine house, cost $6,000.....	J. L. Watterson, City Clerk.
Nebraska.....	Alliance.....	Jan. 9, 3 p.m.....	Furn. combination chemical engine and hose cart.....	J. D. Emery, City Clerk.
California.....	Eureka.....	Feb. 6, 8 p.m.....	Furn. automobile combination chemical and hose wagon....	City Clerk.
			BRIDGES	
Colorado.....	Trinidad.....	Jan. 5, 10 30 a.m...	Constrn. 50-ft. span bridge.....	F. G. Harlan, Chm. County Comm.
New York.....	Tarrytown.....	Jan. 6, 11.30 a.m...	Constructing concrete bridge.....	Wulff Eng. Co.
California.....	Los Angeles....	Jan. 8, 2 p.m.....	Constrn. concrete bridge.....	H. J. Leland, Clk., Bd. Supervisors.
Washington..	Sunnyside.....	Jan. 8, 8 p.m.....	Constrn. bridge.....	Town Clerk.
Pennsylvania..	Bristol.....	Jan. 9.....	Constrn. reinforced concrete bridge.....	Borough Council.
California.....	Merced.....	Jan. 9, 10 a.m.....	Constructing concrete and wooden bridge.....	Board of Supervisors.
Louisiana.....	New Iberia.....	Jan. 11, 11 p.m.....	Constrn. steel bridge at Oliver.....	Police Jury.
Ohio.....	Mt. Vernon.....	Jan. 13, 1 p.m.....	Constrn. bridge, 75-ft. span, 14-ft. roadway.....	County Comm.
Oklahoma.....	Nowata.....	Jan. 15, 2 p.m.....	Constrn. reinforced concrete bridge.....	Ed. Elliott, County Clerk.
Iowa.....	Ottumwa.....	Jan 15, 8 p.m.....	Cleaning and painting bridge.....	W. W. Cummings, Chm. St. Com.
Ohio.....	Sandusky.....	Jan. 15, 1.30 p.m...	Constrn. system of pile bents for bridge approach.....	Board of Commissioners.
California.....	San Luis Obispo..	Jan. 21.....	Constrn. steel highway bridge.....	County Supervisors.
Iowa.....	Esterville.....	Jan. 23, noon.....	Constructing several reinforced concrete bridges.....	W. H. Gibbs, Chm Supervisors.
Arkansas.....	Osceola.....	Jan. 25, 10 a.m.....	Constrn. 17 wooden and 22 steel bridges.....	Drainage District No. 9.
			MISCELLANEOUS	
California.....	Oakland.....	Jan. 5, noon.....	Constrn. concrete quay wall.....	F. R. Thompson, City Clerk.
Illinois.....	Chicago.....	Jan. 8, 2 p.m.....	Furn. auto ambulance.....	County Comm.
Louisiana.....	Lake Chares.....	Jan. 9, 10 a.m.....	Erecting 2-story and basement concrete and brick jail.....	Favrot & Livaudais, Ltd., Architects, 839 Gravier st., New Orleans, La.
South Carolina	Columbia.....	Jan. 9, 10 a.m.....	Erecting abattoir.....	City Council.
Ohio.....	Cleveland.....	Jan. 10, noon.....	Purchase of garbage tankage of Cleveland Disposal Plant for period of Jan. 10, 1912, to Jan. 10, 1913.....	A. B. Lea, Dir. Pub. Service.
Missouri.....	Kansas City.....	Jan. 10, 2 p.m.....	Cleaning 18,000 ft 30 in. water pipe.....	Board of Fire and Water Comm.
New York.....	New York.....	Jan. 11, noon.....	Constrn. section 3, Lexington Ave. Rapid Transit R. R.....	T. H. Whitney, Sec'y Pub Ser. Com.
Ohio.....	Cleveland.....	Jan. 11, noon.....	Purchase of 2,000,000 lbs. garbage grease of the Cleveland Disposal Plant.....	A. B. Lea, Dir. Pub. Service.
Ohio.....	Cleveland.....	Jan. 12, noon.....	Purchase of waste paper, rags, copper, scrap iron, bottle brass, lead, etc., collected by street cleaning department...	A. B. Lea, Dir. Pub. Service.
Illinois.....	E. St. Louis.....	Feb. 7, noon.....	Constrn. concrete tunnel, 9x7 ft., 95 ft. long.....	H. D. Sexton, Pres. Trustees.

STREET IMPROVEMENTS

Jasper, Ala.—Road bond election will be held March 12. Board of County Commissioners unanimously passed all resolutions necessary for calling and conducting election. Proposed bond issue will be $300,000.

Meridian, Cal.—County Surveyor L. M. Bunce is in Meridian with three surveyors inspecting streets of town for purpose of having certain streets in southern part made wider to comply with law.

San Jose, Cal.—Plans and specifications for purchase of rock crushers have been adopted.

San Jose, Cal.—Route for proposed new State highway, for which people of California recently authorized bond issue of $18,000,000, through Santa Clara County will be selected by Board of Supervisors. Board will immediately report to State Highway Commission its choice of route.

Bristol, Conn.—Superintendent of Public Works Anderson is in conference with Highway Commissioner James H. MacDonald in view of getting Commissioner to authorize macadamizing of Hartford and Waterbury trunk line in western section of this city.

Fernandina, Fla.—Entire bond issue of $60,000 of districts Nos. 1, 2 and 3 of Nassau County, for purpose of building hard road to Nassau River and half of bridge across river has been purchased by First National Bank of Fernandina.

Kissimmee, Fla.—Special municipal election held to decide whether City Council should be authorized to borrow $25,000 for purpose of curbing, grading and paving was carried as follows: For paving, 95; against paving, 43.

Live Oak, Fla.—Bonds of $22,000 value will be sold and funds used for paving Ohio ave., Howard st. and Railroad st. with vitrified brick.

Pensacola, Fla.—It is the intention of Board of County Commissioners to have concrete curbing placed along each side of road all way between Bayou Chico bridge and Bayou Grande bridge, and at next regular meeting of Board it is probable that bids will be advertised for completion of work.

St. Augustine, Fla.—At City Council meeting steps were taken which indicates that authorities will push work of permanent street pavements as rapidly as possible, and several of principal unpaved streets will be paved with macadam asphalt before close of the season. Chairman Auburn of Street and Lane Committee introduced ordinance providing for paving with asphalt of Sarragossa st., from Cordova west to Malaga, and also for Central ave., from King st. to Bridge st.

Dublin, Ga.—Bond issue of $300,000 will be voted on by Laurens County for road construction.

Indianapolis, Ind.—Board of Park Commissioners has instructed its engineer and attorney to take up question of improvements contemplated in east park district. It is proposed to acquire ground and construct boulevards along Pleasant Run and along Pogues Run, between Spades and Brookside parks.

Kendallville, Ind.—Plans are being made by City Council for paving of N. Main, from Lake Shore Railroad to North st., and Diamond st., from Main to East st., and alley between Main and Orchard sts., from Mitchell to William.

Muncie, Ind.—Board of Public Works is planning to pave seven streets as follows: Washington st., from W. Washington st. bridge to C. I. & E. Railroad; Elm st., from Charles st. to Big Four Railroad; Seymour st., from Elm st. to Mulberry st.; Jackson st., from High st. to Kilgore ave.; Charles st., from High st. to Liberty; Ohio ave., from Main st. to Washington st., and Madison st., from Main st. to Kirby ave.

Richmond, Ind.—A step toward construction of river boulevard has been taken at special session of Board of Works when City Engineer was instructed to prepare plans and specifications for boulevard from National road to S. L. st.

Topeka, Kan.—Resolutions are being considered for grading, paving and curbing of following: Buchanan st., from 20th st. to Hampton st.; Huntoon st., from Fillmore st. to Clay st.; West st., from Huntoon to 15th st.; Branner st., from Second st. to Fourth st.; Huntoon st., from Lincoln st. to Mulvane st.; 14th st., from Van Buren st. to Harrison st.; 15th st., in Ott & Tewsbury's addition, and between Edwards tract and Throop's fourth addition, from Western ave. to Buchanan st.; 16th st., from Mulvane st. to College ave.; Euclid ave., from Kansas ave. to Bolles ave. For grading and paving of following: Alley between Topeka ave. and Tyler st.; alley between Harrison st. and Topeka ave. For grading and curbing of Arch st., from 11th st. to lot 389, Polk st., Stilson & Bartholomew's addition.

Louisville, Ky.—Ordinances have been passed for improvements to various streets of city.

Baltimore, Md.—City will advertise about Jan. 10, 1912, for proposals on large amount of street paving, as follows: About 15,000 sq. yds. of resurfacing cobble pavement with sheet asphalt, 1½-in. binder and 1½-in. topping; about 10,000 sq. yds. of sheet asphalt on 4-in. and 6-in. concrete bases; about 20,000 sq. yds. of Belgian block paving; about 20,000 sq. yds. of vitrified block paving. It is the intention of City Engineer to group above classes of paving into contracts averaging from $85,000 to $100,000, and group locations so that contractor will have all his paving in as congested area as possible. About Jan. 17 there will be advertised, possibly, 5 miles additional of similar paving in about same proportion as above, and on Jan. 24 8 miles additional, making total of about 20 to 25 miles of paving advertised during January. In these advertisements there will be contracts amounting to over $1,000,000. H. K. McKay, City Engineer.

Rockville, Md.—County Commissioners have directed County Superintendent of Roads to begin at once work of opening up quarries and getting out stone for resumption of road improvement in early spring. First work to be done will be to extend pike from Darnestown to Dawsonville, and to continue work on piking road from Cedar Grove to Damascus.

Monroe, Mich.—Special election will be held on Jan. 15 to pass upon question of issuing $55,000 bonds for good roads, to be expended in constructing 6½ miles on United States turnpike and 1½ miles on Manhattan road.

Owosso, Mich.—By vote of 904 to 388 Owosso taxpayers have rendered verdict favorable to issue of so-called paving bonds in sum of $15,000.

Winston-Salem, N. C.—Salem has voted to issue $75,000 in bonds, $50,000 of which will be used in establishing graded school, $15,000 on street improvements and $10,000 on extension of sewerage system.

Atlantic City, N. J.—Ordinance has been passed authorizing issuance of $20,000 worth additional Boardwalk bonds.

Cranford, N. J.—Ordinances to grade Union ave., between Willow st. and Chestnut pl., and between Chestnut pl. and Lenox ave., have passed final reading at meeting of Township Committee.

Elizabeth, N. J.—Ordinance has been

passed to order and cause Third ave. from Spencer st. to Florida st., to be paved with specification trap block pavement on concrete foundation.

Ocean City, N. J.—City Commissioners have ordered advertisement for building extension with its approaches of Boardwalk, from 17th and 23d sts.

Albany, N. Y.—Widening of State st. is being considered.

Albany, N. Y.—Ordinance has been signed authorizing Mayor to sign petition for paving of Broadway, between Columbia st. and Clinton ave.

Herkimer, N. Y.—Resolution has been adopted for improvement of portion of route No. 24, which extends from bridge south of village of Old Forge, and extends to Eagle Bay road.

Niagara Falls, N. Y.—Board of Public Works has adopted resolutions asking City Engineer for estimates upon about $250,000 worth of public improvements, consisting of pavements and sewers. Pavements asked for are on Lockport st., from Main to the Central tracks; Portage road, Buffalo ave. to Main; 11th st., Ontario to Portage; 18th st., Pierce to Ontario; Grove, Main to 13th; 13th, South to Pierce; Ferry ave., Seventh to Ninth. This means many miles of pavements.

Schenectady, N. Y.—Ordinance has been passed directing grading, curbing and paving of Campbell ave., from end of present pavement to city line.

Seneca Falls, N. Y.—Petition will be considered asking village to authorize additional $8,000 for paving Cayuga st. with brick instead of macadam bitumen pavement.

Yonkers, N. Y.—Ordinance is being considered authorizing that Rumsey road be widened on easterly side thereof, from Wendover road 207.69 ft. northerly.

Cincinnati, O.—Surveyor Cowen estimates it will cost $44,883.30 for improvement of River rd., from West Baltimore pike to New Haven and Venice rd., and he has been directed to prepare plans and specifications.

Cleveland, O.—Ordinance has been passed appropriating property for opening, extending and improving East 57th st.

Columbus, O.—Council has adopted resolution for extension of Hayes ave., from Mt. Vernon ave. to Atcheson st., and carrying with it appropriation of $3,500 to cover expenses.

Hamilton, O.—Bids will be received at office of City Auditor H. A. Crimmer until noon, 12 o'clock, on 23d of January, 1912, for $3,935.50 "G" st. improvement bonds and $2,221.20 Fairgrove ave. improvement bonds.

Sebring, O.—Bids will be received at office of City Clerk at 12 noon, Jan. 22, for purchase of $5,000 bonds for paving of Ohio ave.; $3,300 bonds for paving of 15th st.; $2,400 bonds for paving of 16th st., and $7,800 bonds for paving of Maryland ave.

Toledo, O.—Ordinance has been passed providing for issuance of bonds for paving of Tecumseh st., from 15th st. to Division st.

Toledo, O. — Resolution has been adopted for improving alley between Southard ave. and Smith st. by paving.

Youngstown, O.—Resolutions have been adopted for improving various streets of city.

Harrisburg, Pa.—Ordinance has been passed for paving and curbing of Howard st. from Forrest to Woodbine, and Derry st. from point 180 ft. east of 18th st. to 24th st.

Pittsburgh, Pa.—Widening of Baum st., from Rebecca st. to Highland ave., has been reported on favorably by special committee.

Pittsburgh, Pa.—Improvements of following streets have been recommended: Extension of Diamond st. through Diamond sq. to Liberty ave., and to widen thoroughfare to 60 ft. not only for that distance, but from Smithfield st. to morgue. It is also proposed that Oliver ave. shall be widened to 60 ft. from Smithfield st. to Grant st., instead of 44 ft., as now planned; that Strawberry alley shall be widened from Liberty st.; that Seventh ave. shall be extended through Hancock school one square, from Webster to Wylie, connecting at latter street with Washington st., and that Sixth ave. shall be extended through to Second ave.

Williamsport, Pa.—Ordinance has been passed providing for grading and paving, from curb to curb, with asphalt, block, brick or other approved paving material, on concrete foundation, and curbing of all that portion of Neece st. from W. Fourth st. to south side of Edwin st.

Orangeburg, S. C.—City Council has recently decided to pave Russell st. with vitrified brick, which will cost about $15,000. New work will commence at Lowman st. and proceed to Southern depot, and from Russell st. down Broughton st. to Hampton st.

Knoxville, Tenn.—At meeting of Board of Public Works chairman was instructed to advertise for bids for grading and curbing of Second st., north of Highland ave.

Beaumont, Tex.—Calder ave. is to be paved from First st. to city limits. Recently J. B. Smyth offered to do paving with Uvalde asphalt for $1.15 per yd. The resolution, which provides for bids, does not specify character of paving. This will be determined when bids are all in. Council has also authorized City Secretary to advertise for bids for paving Washington st., from Pearl to Orleans, and Calder ave., from Gulf to First st.

Beaumont, Tex.—Citizens have voted in favor of $60,000 paving bonds.

Denton, Tex.—Bonds in sum of $75,000 will be issued by Denton County Road District No. 1 for road improvement.

Mexia, Tex.—Bond issue of $150,000 has been voted for road construction by Precinct No. 4 of Limestone County.

Orange, Tex.—Proposal to issue $200,000 bonds for building system of good roads in this county has been voted upon favorably by poeple of Orange.

Boydton, Va.—Issuance of $240,000 road bonds have been authorized by Mecklenburg County.

Seattle, Wash.—Plans have been approved for grading of Sixth ave. Northeast; estimated cost $3,500.

Seattle, Wash.—Ordinance has been passed authorizing Mayor and City Comptroller to issue local improvement bonds for improvement of 16th ave. Northeast, from E. 65th st. to E. 75th st., by constructing concrete sidewalks; also for improvement of 63d ave. Southwest, from Alki ave. on north to Alki ave. on south, by grading, and improvement of 18th ave. Northeast, from E. 65th st. to E. 75th st., by constructing concrete sidewalks.

Beloit, Wis.—Improvements to various streets are being discussed.

Vancouver, B. C., Can.—City Engineer has recommended: Block pavement, $122,443; asphalt, $116,551; asphalt and vitrified brick, $301,460; creosoted block, $110,608; bitulithic, $67,176; vitrified brick, $96,536.

St. Catharines, Ont., Can.—Extensions will be made to bitulithic pavement, concrete curb, to cost $21,778.

Woodstock, Ont., Can.—Oxford County Council has decided to spend $60,000 for construction of good roads in county, and debentures will be issued at once. Work will be commenced as soon as possible.

Montreal, Que., Can.—City Controllers have recommended appropriation of $650,000 for street improvements for year's budget.

CONTRACTS AWARDED

Bessemer, Ala.—For laying of cement sidewalks on Fourth ave., between 14th and 15th sts., to W. F. Nolan.

Gadsden, Ala.—By City to Gadsden Concrete Co., Gadsden, for 2,295 sq. yds. sidewalk, 50 sq. yds. driveway, 2,140 lineal ft. curb and gutter, 100 ft. 5-ft. gutter, 6 catch basins and 1,400 cu. yds. grading; amount of bid, $3,710.

Hamilton, Ala.—For grading, draining and surfacing with gravel 2½ miles of State aid road, to A. F. Bearden, of Birmingham, for 3½ miles gravel road at $8,000, and 11½ miles grade, $11,835.

Los Angeles, Cal.—By Board of Public Works, for paving as follows with asphalt: Workman st. and Wilshire boulevard, to Barber Asphalt Paving Co., of Los Angeles, at $9,254 and $227,198, respectively, for grading, graveling and constructing sidewalks on portion; Normandie ave., to E. C. Beck, at $6,966, and for asphalt paving on Hope st., to Fairchild, Gilmore Wilton Co., Pacific Electric Bldg., $24,854.

Oakland, Cal.—By City Council, for sidewalk work on 57th st., to Oakland Paving Co.; for sidewalk on 47th st., to Oakland Paving Co.

Lodi, Cal.—By Supervisors, to Cy & Will Moreing, for improvement of Lodi-Lockeford road, according to plans of the County Good Roads Commission, at $27,803.20. The Moreings also were awarded contract for improving 7 miles of road between Stockton and Lathrop, at $32,000. Another short piece of road was contracted to same firm for $1,500 on road known as Jacobs road.

San Jose, Cal.—By Common Council upon recommendation of Finance Committee, for sidewalks in front of city property bounded by Sixth, Seventh and Empire sts.; in front of Ryland Park, on San Pedro st., and on River st., between Park ave. and San Fernando st., to M. Montoya, at 8 cents per sq. ft. For curbs and gutters in front of same property to M. E. Kilcourse, at 30 cents per lineal ft. for curbs and 11 cents per sq. ft. for gutters, in accordance with their respective bids.

Fort Lauderdale, Fla.—By City, for grading and paving N. River st., from O'Neill ave. to Andrews ave., to Hutton-Gladden Co.

Rockford, Ill.—By Board of Local Improvements, to A. E. Rutledge, city, for approximately 2,300 cu. yds. excavation and 4,600 sq. yds. brick pavement, on concrete foundation, on N. Water st., from State to Jefferson st.

Lexington, Ky.—By Council, to C. H. Daugherty for construction of concrete sidewalks, curb and gutter on High st., from Broadway to Ashland ave., and on Upper st., from High to Winslow, at following prices: Sidewalks 15 cents per sq. ft.; concrete curbing 50 cents per lin. ft.; concrete curb and gutter combined 60 cents per lin. ft. To F. T. Justice & Co., for concrete sidewalks, curb and gutter on Mill st., from Main st. to High st., and on Second st., from Limestone to Jefferson st., at following prices: Concrete sidewalks, 16 cents per sq. ft.; concrete curb and gutter combined, 60 cents per lin. ft. To F. T. Justice & Co., for construction of concrete curb and gutter combined on Arlington ave., from High to Maxwell, at price of 60 cents per lin ft. To F. T. Justice & Co., for construction of concrete sidewalks, curb and gutter on N. Broadway, from Short st. to C. & O. Belt Line bridge, at following prices: Concrete sidewalks, 16 cents per sq. ft.; concrete curb, 50 cents per lin. ft.; concrete curb and gutter combined, 60 cents per lin. ft. To Louis des Cognets & Co., for construction of concrete sidewalks, curb and gutter on Rose st., from Main to High st., at following prices: Concrete sidewalks, 15¾ cents per sq. ft.; concrete curb and gutter combined, 63 cents per lin. ft.

Louisville, Ky.—For paving Spratt st., from Goss ave. to Ellison ave., by Board of Public Works, to G. W. Gosnell, at $1.80 per sq. yd. Total bid was $13,200.

New Orleans, La.—By City to Thomas Eagan at $55,283 for paving Burgundy st. from Poland to Delery with asphalt.

Baltimore, Md.—By State Roads Commission for construction of 4 7-10 miles of Baltimore-Washington boulevard to Bush, Moller & Smith at $52,507.

Carthage, Mo.—For paving Third and Main sts., to R. J. & W. N. Boyd Construction Co., of Kansas City, at $1.72 per sq. yd. for asphalt.

Maplewood, Mo.—To G. A. Heman Construction Co., of St. Louis, to pave Manchester road, from St. Louis city limits to Sutton ave., at $21,240, by Maplewood City Council. Paving will be brick, with granitoid curbing, and include 12-in. storm sewer; also to Graham Granitoid Co., of St. Louis, for laying several thousand feet of sidewalk in Maplewood, at $18,183.

Paterson, N. J.—By Freeholders, for permanent improvement of River road, from Vreeland ave. to Wesel Brook, to George F. Brackett, at $40,000.

Rochester, N. Y.—By Board of Contract and Supply for walks, grading and sewer for Morton st., to F. V. Brotsch at $8,435.

Syracuse, N. Y.—For paving Victoria pl., between Allen and Westcott sts., to Warner-Quinlan Asphalt Co., at $6,035. Sheet asphalt and stone curbing are to be used. W. J. Burns Co. was awarded contract for grading Teall ave., at $6,551.

Connellsville, Pa.—For paving West Side Hill with brick is reported awarded to O'Connor & Madigan, at $1.50 per sq. yd.

Akron, O.—By City, for paving of Second ave., from Arlington st. to Kelly ave., to F. McShaffrey & Son, contractors, at their bid of $24,500.

Akron, O.—By Department of Public Service, for Coris st. paving, to Wildes & Davidson, for $25,700, and for Highland ave. paving, to the Portage Engineering Co., for $13,778.

Reading, Pa.—By Board of Public Works for paving of Front st. between Washington st. and Schuykill ave., on the east side, with vitrified block, to Bobst Bros., and Greenwich st., between 13th and Linden, with granite block, to John E. Weidner. Both awards are subject to the ratification of Councils. Bids were: Bobst Bros., Mack white block, $1.96 a sq. yd.; Bessemer block, $2.08; Metropolitan block, $2.18; extra concreting, $5 a sq. yd. John K. Faust, Mack block, $2.07; McAvoy block, $2.03; Pinegrove block, $1.94; granite block, $1.09; concrete work, $5.75 per sq. yd.; extra concrete work, $4.75 a sq. yd. John E. Weidner, McAvoy block, $1.99; Mack block, $2.10; granite block, 89 cents; concrete work, $6 per sq. yd.; extra concrete work, $6 a sq. yd.

Edmonton, Alta., Can.—For 100,000 sq. yds. paving, to National Paving Co., for

30,000 sq. yds., and to the Bitulithic Construction, Ltd., 10,000 sq. yds., at $2.85 per yd.

BIDS RECEIVED

Lexington, Ky.—For paving W. Third, Jefferson to Henry, as follows: Henkle & Sullivan—Asphalt, $1.42 per sq. yd.; concrete, $5.50 per cu. yd.; limestone curbing, 70 cents per lin. ft.; concrete curbing and guttering, 60 cents per lin. ft.; resetting old curb, 10 cents per lin. ft.; resetting manhole tops, $4 each; cement paving in gutters, $1.50 per sq. yd.; brick paving in car tracks, $1.75 per sq. yd.; concrete in car tracks, $5.50 per cu. yd.; headers, 50 cents each. Andrews Asphalt Paving Co.—Asphalt, $1.50 per sq. yd.; limestone curb, 80 cents per lin. ft.; concrete curb and gutter, 70 cents per lin. ft.; resetting manhole tops, $4 each; cement paving in gutters, $1.15 per sq. yd.; brick paving in car tracks, $2 per sq. yd.; concrete in car tracks, $7 per cu. yd.; neaders, 50 cents each. Carey & Reed—Asphalt, $1.40 per sq. yd.; concrete, $5.50 per cu. yd.; limestone curb, 60 cents per lin. ft.; concrete curb and gutter, 60 cents per lin. ft. resetting old curbing, 15 cents per lin. ft.; resetting manhole tops, $2.50 each; cement paving in gutters, $1.25 per sq. yd.; extra binder, $5.50 per cu. yd.; brick in car tracks, $1.80 per sq. yd.; concrete in car tracks, $5.50 per cu. yd.; headers, 50 cents each. For paving Water st., from Limestone to Broadway: Carey & Reed—Brick paving, $1.60 per sq. yd.; wooden block paving, $2.50 per sq. yd.; asphalt, $1.40 per sq. yd.; granite, $2.75 per sq. yd.; concrete, $5 cu. yd.; limestone curb, 60 cents lin. ft.; granite curb, $1.10 per lin. ft.; resetting old curb, 15 cents lin. ft.; resetting manhole tops, $2.50 each; brick paving in gutters, $1.65 sq. yd.; cement paving in gutters, $1.25 sq. yd.; headers, 65 cents each; 15-in. pipe, 60 cents ft.; 12-in. pipe, 60 cents ft.; catch basins, $40 each. Kelley Bros.—Brick paving, peebles block, pitch filler, $1.60 sq. yd.; peebles block, cement filler, $1.55 sq. yd.; concrete, $4.89 cu. yd.; limestone curb, 65 cents ft.; granite curb, 75 cents ft.; resetting old curb, 15 cents ft.; resetting manhole tops, $5 each; limestone headers, 75 cents each; 15-in. pipe, 90 cents. ft.; 12-in. pipe, 80 cents ft.; catch basins, $25 each. Andrews Asphalt Paving Co.—Asphalt paving, $1.50 sq. yd.; concrete, $5.50 cu. yd.; limestone curbing, 80 cents ft.; granite curb, $1.10 ft.; resetting old curb, 25 cents ft.; resetting manhole tops, $4 each; limestone headers, $1 each; 15-in. pipe, $1.40 ft.; 12-in. pipe, $1.20 ft.; catch basins, $50 each. Central Construction Co.—Brick paving, $1.75 sq. yd.; wooden block paving, $2.10 sq. yd.; granite paving, $2.60 sq, yd.; concrete, $5.40 cu. yd.; limestone curb or headers, 60 cents; granite curb, $1 ft.; resetting old curb, 15 cents ft.; cement paving in gutters, $1.35 sq. yd.; 15-in. pipe, $1.25 ft.; 12-in. pipe, $1.10 ft.; catch basins, $50 each; brick paving with cement filler, 10 cents less per sq. yd. For S. Limestone, from Winslow to Virginia: Central Construction Co.—Brick paving, $1.60 sq. yd.; wooden block paving, $2.10 sq. yd.; asphalt binder—Standard $1.20 sq. yd., Bermudez $1.40 sq. yd., Tarvia $1.30 sq. yd.; concrete, $5.25 cu. yd.; concrete curb and gutter, 65 cents ft.; limestone curb, 60 cents ft.; granite curb, $1 ft.; concrete curb, 55 cents ft.; resetting manhole tops, $2.50 each; brick paving in gutters, $1.75 sq. yd.; cement paving in gutters, $1.35 sq. yd.; limestone headers, 60 cents; 24-in. pipe, $1.75 ft.; 18-in. pipe, $1.35 ft.; 12-in. pipe, $1.10 ft.; brick paving in car tracks, $1.75 sq. yd.; concrete in car tracks, $5.40 cu. yd.; manholes, $30 each; catch basins, $50 each. Carey & Reed—Brick paving, $1.60 sq. yd.; wooden block paving, $2.50 sq. yd.; asphalt paving, $1.40 sq. yd.; concrete, $4.50 cu. yd.; concrete curb and gutter, 55 cents ft.; resetting old curb, 15 cents ft.; resetting manhole tops, $2.50 each; cement paving in gutters, $1.25 sq. yd.; brick paving in car tracks, $1.75 sq. yd.; concrete in car tracks, $4.75 cu. yd.; limestone headers, 50 cents; 24-in. pipe, $1.90 ft.; 18.-in. pipe, $1 ft.; 12-in. pipe, 75 cents ft.; manholes, $30 each; catch basins, $40 each. Henkle & Sullivan—Asphalt, $1.42 sq. yd.; concrete, $5.50 cu. yd.; concrete curb and gutter, 65 cents ft.; resetting old curbing, 10 cents ft.; resetting manhole tops, $4 each; cement paving in gutters, $1.50 sq. yd.; brick paving in car tracks, $1.75 sq. yd.; concrete in car tracks, $5.50 cu. yd.; limestone headers, 60 cents; 25-in. pipe, $1.90 ft.; 18-in. pipe, $1.50 ft.; 12-in. pipe, $1 ft.; manholes, $40 each; catch basins, $50 each. Andrews Asphalt Paving Co.—Asphalt paving, $1.60 sq. yd.; concrete, $5.50 cu. yd.; concrete curb and gutter, 70 cents ft.; resetting manhole tops, $4 each; cement paving in gutters, $1.15 sq. yd.; brick paving in car tracks, $2 sq. yd.; concrete in car tracks, $7 cu. yd.; headers, 50 cents; 24-in. pipe, $2 ft.; 18-in. pipe, $1.60 ft.; 12-in. pipe, $1.20 ft.; manholes, $35 each; catch basins, $50 each. Kelley Bros.—Brick paving, peebles block, cement filler, $1.55 sq. yd.; pitch filler, $1.60 sq. yd.; concrete, $4.89 cu. yd.; concrete curb and gutter, 60 cents ft.; resetting old curb, 15 cents ft.; resetting manhole tops, $5 each; brick paving in car tracks—cement $1.60 sq. yd., pitch $1.65 sq. yd.; concrete in car tracks, $4.89 cu. yd.; limestone headers, 75 cents; 24-in. pipe, $2 ft.; 18-in. pipe, $1.70 ft.; 12-in. pipe, $1.25 ft.; manholes, $30 each; catch basins, $25 each; rock excavation, $4 cu. yd.

Schenectady, N. Y.—For paving of Elk st., from S. Salina st. to Delaware, Lackawanna & Western railroad. Lowest bid was for macadam with concrete curb, which was $2,687 less than lowest proposal for asphalt with stone curb. The proposals received as follows: Paving Elk st., uniform pavement with stone curb—Central City Paving Co., macadam, $9,416; sandstone block, $16,306.05; Mack block, $11,849.80; Trinidad asphalt, $11,-694.80. F. J. Baker, sandstone block, $15,-973.75; Olean block, $11,827.50; Trinidad asphalt, $11,517.50. Warner-Quinlan Asphalt Co., sandstone block, $16,616.25; Olean block, $11,850; Trinidad asphalt, $11,587.50. Paving Elk st. with asphalt in center and block at sides, with stone curb—Central City Paving Co., asphalt and sandstone block, $12,840.20; asphalt and Mack block, $11,721.20. F. J. Baker, asphalt and sandstone block, $12,276.50; asphalt and Olean block, $11,570.30. Warner-Quinlan Asphalt Co., asphalt and sandstone block, $12,436.75; asphalt and Cowan block, $11,622.95. Paving Elk st. with uniform macadam and concrete curb—Central City Paving Co., $8,830.50. For grading Boyden ave., from Greenway ave. east to farm lot No. 234—Blanche Gaffey, $5.60; A. Sposato, $4.90; E. S. Sposato, $560. Grading Spring st., from Butternut st. to John st.—Albert Gaffey, $491; A. Sposato, $472.50; F. S. Sposato, $607.50. Grading Avery ave., from Essex st. to Milton ave.—C. T. Hookway, $4,220; Lowery Bros., $3,460; James Swift, $3,920; Blanche Gaffey, $3,336; S. Bonn, $3,259; S. Sposato, $4,114; F. S. Sposato, $3,620.

SEWERAGE

Summerville, Ga.—Bids will be received on following: 1,150 lin. ft. 36-in. t. c. pipe sewers: 3,200 lin. ft. 24-in. t. c. pipe sewers; 2,500 lin. ft. 22-in. t. c. pipe sewers; 2,600 lin. ft. 20-in. t. c. pipe sewers; 3,300 lin. ft. 18-in. t. c. pipe sewers; 1,400 lin. ft. 15-in. t. c. pipe sewers; laid at an average depth of 7 ft.; 7,300 lin. ft. 30-in. c. i. pipe water mains, with necessary specials, 3 ft. covering; 40 manholes, 70 catch basins, 20 hydrants, 8-in. two way.

Vincennes, Ind.—Board of Works expects to have revised sewer franchise, which is to give city complete sanitary sewer system, ready for presentation to Council.

Fort Scott, Kan.—Bids will be received by Mayor for construction of sewer system, from plans of J. S. Worley Co., of Kansas City, Mo.; estimated cost $100,000.

Fort Scott, Kan.—Council has accepted plans of Morley & Black, supervising engineers, for big East Side sewer districts.

Mulvane, Kan.—City Council has decided to construct sewer system to cost $10,000.

Louisville, Ky.—Ordinance has been passed for construction of sewer in Jefferson st., between Clay and Hancock sts.

California, Mo.—Bids will be received by H. E. Blakeman, City Clerk, for $15,-000 sewer bonds.

St. Joseph, Mo.—Ordinance will be considered for construction of sewer, together with all necessary manholes, combined inlets and catchbasins, in portion of sewer district No. 117.

Winston-Salem, N. C.—Salem has voted to issue $75,000 in bonds, of which 10,000 will be used in extension of sewerage system.

Rahway, N. J.—Ordinance has been passed over Mayor's veto for construction of sewer in Main st., from Monroe to Irving st.

Trenton, N. J.—Ordinance has been adopted to authorize construction of sewer No. 543 in Morris ave.

Trenton, N. J.—City Commissioners are discussing resolution introduced by Commissioner Fell granting city right to install sewage disposal plant in Hamilton Township.

Binghamton, N. Y.—Common Council will pass ordinance directing Commissioner of Public Works and Corporation Counsel to begin condemnation proceedings to obtain rights of way for South Side trunk sewer through private lands.

Niagara Falls, N. Y.—Board of Public Works has adopted resolutions asking City Engineer for estimates upon about $250,000 worth of public improvements, consisting of sewers and pavements. Two trunk sewers alone, upon which estimates are asked, will be about 3 miles in length. These are necessary to relieve sewers that flow from North and South ends into Cleveland ave. sewer at Main and 10th and 11th sts. Trunk sewers would be laid in 24th st., from East Falls to Cayuga sts., and in 27th st., from East Falls to Michigan ave. Connecting sewers would be in Quay st., Whirlpool st., Whirlpool ave., 11th st., Lockport st., Augustus pl., Townsend pl., 18th st. and Shilton ave.

Syracuse, N. Y.—The Intercepting Sewer Board is considering construction of storm water sewer in northeastern section of city. It will be constructed in Teall ave. and other streets, and will extend through portion of town of Salina to Lay Creek.

Hamilton, O.—Bids will be received at the office of City Auditor H. A. Grimmer until noon, 12 o'clock, on 23d day of January, 1912, for purchase of $2,500 worth of storm sewer bonds of city of Hamilton.

Hamilton, O.—Bids will be received at office of City Auditor H. A. Grimmer until noon, Jan. 23, 1912, for purchase of $513.60 North Fifth st. sanitary sewer bonds.

Sebring, O.—Bids will be received at office of City Clerk at 12 noon, Jan. 22, for purchase of $6,500 bonds for construction of sewers in California, Tennessee, New York ave. and in 21st st.

Springfield, O.—According to ordinances passed at regular Council meeting, work of giving city sewerage system will be carried on just as rapidly as possible from now on.

Springfield, O.—Laying of storm drain for South End has been planned. Bonds aggregating $41,000 have been authorized, and sanitary sewers will probably be laid in N. Yellow Springs st. and in E. Main st.

Toledo, O.—Resolution has been passed declaring it necessary to construct local sewer No. 1,133 in main sewer district No. 12, in city of Toledo.

Toledo, O.—Ordinance has been passed providing for issuance of bonds to pay for construction of sewer No. 1,106.

Tillamook, Ore.—City Council is considering construction of sewer system to cost $150,000.

Harrisburg, Pa.—Ordinance has been passed for consstruction of sewer in 15th st., from Market to Crabapple.

Beaumont, Tex.—Citizens have voted in favor of $30.000 sewer bonds.

Seattle, Wash.—Ordinance has been passed authorizing Mayor and City Comptroller to issue local improvement bonds for improvement of 32d ave. North, from E. John st. to E. Harrison st., by constructing sewers, etc.

Vancouver, B. C., Can.—Construction of sewers in streets and lanes to amount of $34,970 has been recommended by City Engineer Fellowes.

Weston, Ont., Can.—Ratepayers at meeting have voted unanimously in favor of sewage system. E. A. James, Engineer Good Roads Commission, has estimated trunk sewer on Main st. and large septic tank to cost $20,000.

CONTRACTS AWARDED

Chico, Cal.—To J. W. Terrel, for construction of three auxiliary storm sewers on Wall, Salem and Orange sts., at cost of $2,166.07. M. A. Elkman was lowest bidder on original contract, but City Engineer Polk decided that more catch basins were necessary, and as Terrel had quoted lower price on catch basins, his bid totaled lowest.

Milford, Conn.—For putting in tile drain to carry off surface water at lower end of Walnut Beach, to Contractor Elbert N. Clarke.

Unadilla, Ga.—For constructing sewer and water system, to Walton & Wagner, at $22,825. Other bids were: Thrach & Boughon, $24,536; H. L. Bosler, $24,848; A. J. Waxdrep, $25,527; M. P. Flynn & Co., $25,783; Sullivan, Long & Hogarty, $25,963; Dysord Construction Co., $28,508. System includes 5 miles of sewers, 1½ miles of 6 and 8-in. water main, with appurtenances, brick building, reinforced concrete reservoir, 80-hp. boiler, pumping engine and air lift.

Wichita, Kan.—For completing portion of College Hill sanitary sewer, to John Striffler, at $6,000.

New Orleans, La.—By City to Bancroft & Ross at $52,175.40 for construction of subsurface drainage on Burgundy st. from Poland to Deleray st.

Baltimore, Md.—For constructing sewers, by Board of Awards, as follows: To McDermott Contracting Co., Washington, D. C., sanitary sewer No. 81; to Wm. McCarthy & Co., 121 Pearl st., Baltimore, sanitary sewers Nos. 82, 78 and 18; to N. A. Middleton, 515 Continental Bldg., Baltimore, sanitary sewer No. 17. Approximate quantities are as follows: 34,000 lin. ft. 8 to 24-in. vitrified pipe sewer, 1,800 lin. ft. 27-in. brick and concrete, or vitrified pipe sewer, 31,500 lin. ft. house connections; storm water contract, 210 lin. ft. 69 x 36-in. rectangular drain, 6,850 lin. ft. 48 to 36-in. circular drain, 16,100 lin. ft. 24 to 15-in. circular drain, 8,500 lin. ft. inlet connections, 320 inlets, 140 manholes.

Kansas City, Mo.—By Board of Public Works to T. W. Roberts at $26,461 to construct vitrified clay sewer extending from 29th to 35th st. in Raytown road and along Shuttle Creek to Blue River; will drain about 1,200 acres; also construct lateral sewers.

St. Louis, Mo.—For constructing sewers in Lindenwood sewer district No. 1, to John F. McMahon, Wainwright Bldg., St. Louis, at $19,820. Only other bid received was submitted by Harry F. Herman, at $23,180.

St. Louis, Mo.—By Board of Public Improvement, for construction of Lindenwood district sewer, to John F. McMahon, Wainwright Bldg., for $19,819.60.

Phillipsburg, N. J.—For constructing sewer in Thomas st., to M. O. Hagan, at $5,376. Other bids were: J. L. Wichheiser, $6,606; R. C. & C. D. Stewart Construction Co., $6,436; Phillipsburg Supply & Construction Co., $5,523; D. F. Kennedy is Chairman Sewer Committee.

Las Cruces, N. M.—For constructing sewer and water system, by Board of Trustees, to Bash & Gray, Joplin, Mo., $54,953. Other bids as follows: Fred. Dieter, $65,000; F. R. Stone, $56,437; D. B. Gordon, $65,262; G. Jaeger, American Light & Water Co., $61,654; Mayfield Shaw Construction Co., $57,692; E. M. Eby, $61,654; J. C. Huff, $77,537; Peter O'Brien Construction Co., $67,142; M. F. Dicus, $63,427; W. F. Plummer Co., $56,387; W. Jennings & Woods, $73,304; Hamilton Bros. Construction Co., $60,127; W. E. Anderson, $60,463.

Rochester, N. Y.—By Board of Contract and Supply for sewer, walks and grading of Morton st. to F. V. Brotsch at $8,435.

Troy, N. Y.—By Board of Contract and Supply, to Eveline Bros., Waterford, at $28,323, for constructing Pawling ave. and Thompson st. intercepting sewer.

Akron, O.—By Department of Public Service, for outfall sewer, from lock 16 to 26, to James J. Hunt, for $57,360.

Springfield, O.—For constructing sewers in three sections of Columbia st., to M. J. Cooney, at $9,030.

Muskogee, Okla.—For constructing sewers in sanitary sewer district No. 73, to O. A. Wells.

McKeesport, Pa.—For constructing terra cotta sewer, to Henry Bolar, McKeesport, for $5,142.

North Yakima, Wash.—For constructing main storm sewer, to D. T. Daniels, at $43,021. Other bids were: International Contract Co., $43,963; Jahn Construction Co., $45,920; Montague-O'Reilly Co., $51,444; Northwest Municipal Construction Co., $47,521; Beebe & Stephenson, $45,048; Jeffery & Buffton, $45,390; Robinson & Foster, $37,432 (thrown out); Travers & Co., $47,443.

Windsor, Ont., Can.—To Thomas Chick for construction of new sewers on Tuscarrora st. and Gladstone ave.

BIDS RECEIVED

Lexington, Ky.—For construction of sewer on Short, Walnut to Daweese, as follows: Central Construction Co.—8-in. pipe, 58 cents ft.; 5-in. pipe, 35 cents ft.; 5-in. Y branches, 50 cents each; manholes, $30 each; flush tanks, $60 each; rock excavation, $4 cu. yd.; repaving with brick, $1.75 sq. yd. Jonas Lipps—8-in. pipe, 66 cents ft.; 5-in. pipe, 45 cents ft.; 5-in. Y branches, 55 cents each; manholes, $30 each; flush tanks, $65 each; rock excavation, $4.50 cu. yd. A. G. McGregor—8-in. pipe, 58 cents ft.; 5-in. pipe, 44 cents ft.; 5-in. Y branches, 55 cents each; manholes, $23 each; flush tanks, $60 each; rock excavation, $4.50 cu. yd.

Schenectady, N. Y.—For 15-in. pipe sewer in Emerson ave., from Harbor st. to point 400 ft. north of Lewis st., and 12-in. sewer from the last point to Chemung st.—C. T. Hookway, $4,926.80; Blanche Gaffey, $3,113; Samuel Bonn, $5,982.85; James Swift, $4,819.75; F. S. Sposato, $4,351.50. Fifteen-in. pipe sewer in Kenmore ave., from Newell st. to Ostrander ave.—Anthony Sposato, $1,938; F. S. Sposato, $2,153; Charles Bonn, $1,921.75. Fifteen-in. pipe sewer in Loehr ave., from Hoeller st. to center lot No. 1, Loehr tract—Charles Bonn, $612.75; Philip Thomas, $599.50; C. T. Hookway, $820.50; James Swift, $950.25; Blanche Gaffey, $718.50; A. Sposato, $796; F. S. Sposato, $771.50. For 12-in. pipe sewer in Willis ave., from Schuyler st. to Hamilton st., and a 12-in. pipe sewer in Hamilton st., between Milton and Willis ave—Philip Thomas, $1,105.75; James Swift, $1,227; Alexander Barr, $979.50; Blanche Gaffey, $915.50; Samuel Bonn, $1,227; A. Sposato, $1,012.50; F. S. Sposato, $1,243.50; Charles Bonn, $1,166.25.

Pleasant Ridge, O.—Bids were received by H. B. Hayden, Village Clerk, for constructing sewers and sewage purification works from plans of Riggs & Sherman Co., 613 Nasby Bldg., Toledo, as follows: (a) W. McDowell & Son, Bellefontaine, $84,883 for sewers, and $33,227 for purification works; (b) John Snyder, 4436 Forest ave., Norwood, $72,802 and $43,545; (c) McCarthy Bros., 2910 Woodburn ave., Cincinnati, $81,099 and $43,430; (d) Thos. P. Starck, 1400 Myrtle ave., Cincinnati, $60,496 and $29,682; (e) F. M. Benner & Co., Marion, Ind., $63,122 and $35,220, unit prices as follows:

Sewers.	a	b	c	d	e
4-in. form tile in place, per ft.	$0.08	$0.50	$0.10	$0.05	$0.05
6-in. form tile in place, per ft.	.08	.60	.15	.08	.08
48,631 lin. ft. 8-in. vitr. pipe in place	.20	.16	.30	.21	.20½
3,220 lin. ft. 10-in. vitr. pipe in place	.24	.21	.40	.21	.29
6,368 lin. ft. 12-in vitr. pipe in place	.30	.31	.55	.27	.37
3,390 lin. ft. 15-in. vitr. pipe in place	.45	.41	.65	.42	.57
1,735 lin. ft. 18-in. vitr. pipe in place	.65	.61	.90	.59	.60
3,050 lin. ft. 20-in. vitr. pipe in place	.70	.75	1.25	.71	1.02
228 lin. ft. 8-in. c.-i. pipe in place	.65	1.00	2.10	.75	.70
860 lin. ft. 12-in. c.-i. pipe in place	1.60	1.50	4.00	1.25	1.30
24 lin. ft. 20-in. c.-i. pipe in place	..	..	..	..	..
8-in. steel pipe in place	.65	4.00	6.05	1.00	.85
315 lin. ft. 18-in. steel pipe in place	2.00	6.00	6.75	1.50	1.25
10,344 lin. ft. trenching under 6 ft.	.37	.35	.22	.30	.25
31,895 lin. ft. trenching, 6 to 8 ft.	.63	.60	.35	.35	.37
14,674 lin. ft. trenching, 8 to 10 ft.	.81	.70	.65	.50	.47
4,335 lin. ft. trenching, 10 to 12 ft.	1.44	.80	.80	.65	.55
2,970 lin. ft. trenching, 12 to 14 ft.	1.68	.90	1.10	.95	.85
2,180 lin. ft. trenching, 14 to 16 ft.	2.56	1.10	2.00	1.50	1.20
690 lin. ft. trenching, 16 to 18 ft.	2.85	1.50	2.75	2.00	1.75
162 lin. ft. trenching, 18 to 20 ft.	4.00	2.00	3.25	2.50	2.05
82 lin. ft. trenching, 20 to 22 ft.	4.80	3.00	4.00	3.00	2.55
125 lin. ft. trenching, 22 to 24 ft.	5.00	4.00	5.50	4.00	3.80
15 lin. ft. trenching, 24 to 26 ft.	..	..	..	..	..
15 lin. ft. trenching, 26 to 28 ft.	..	..	..	..	..
152 standard manholes, ea.	40.00	40.00	38.00	30.00	40.00
14 drop manholes, ea.	50.00	50.00	60.00	45.00	45.00
16 flush tanks, ea.	60.00	100.00	67.00	60.00	60.00
Extra earth excav., per yd.	1.50	1.00	1.00	.80	.60
Sheeting and lumber, per M ft.	30.00	35.00	35.00	40.00	35.00
206 cu. yds. concrete masonry	6.00	9.00	12.00	10.00	15.00
7.75 tons reinforcing rods	80.00	60.00	100.00	60.00	60.00
Common labor, per hour	.25	.25	.25	.25	.25
Skilled labor, per hour	.50	.60	.80	.75	.75
Team labor, per hour	.50	.55	.65	.60	.60
1-16-in. blow-off valve in place	12.00	50.00	55.00	13.00	25.00

Purification Works.	a	b	c	d	e
7,600 cu. yds. excavation	$0.40	$0.50	$0.60	$0.30	$0.35
4,000 sq. yds. sodding	.18	.20	.20	.10	.25
9,000 sq. yds. grading and seeding	.06	.18	.15	.05	.05
416 cu. yds. concrete in walls, etc.	7.00	9.00	9.00	6.00	10.00
3.9 tons reinforcing rods	80.00	60.00	100.00	30.00	60.00
1,560 ft. 8-in. sewer pipe	.14	.16	.45	.11	.15
5,000 ft. 4-in. sewer pipe	.09	.12	.25	.05	.10
19,500 lbs. galvanized carrier complete	70.00	..	.08	..	..
3,550 cu. yds. gravel for filter beds, per yd.	2.00	1.50	2.00	1.80	1.90
7,560 cu. yds. sand for filter beds, per yd.	2.00	3.00	2.50	1.80	1.90
4 10-in. siphons in place, ea.	150.00	60.00	52.00	136.25	175.00
4 15-in shear valves in place, ea.	35.00	60.00	65.00	31.15	30.00
2 12-in. sluice gates in place, ea.	35.00	60.00	45.00	53.00	40.00
1 12-in. gate valve	35.00	60.00	80.00	34.00	50.00
300 lbs. w.-i. screens, per lb.	.05	.10	.25	.09	.10
950 lbs. 4-in. I-beams in place, per ton	60.00	100.00	40.00	59.00	60.00
450 ft. 1½-in gas pipe rail in place	1.00	.25	.60	.10	.25
6.22 tons 12-in. c.-i. pipe laid	40.00	40.00	56.00	56.00	30.00
.79 ton special castings	80.00	80.00	96.00	55.00	70.00
14 c.-i. cistern covers, ea.	6.00	5.00	7.00	3.35	5.00
1 control house, complete	..	..	..	..	..
Timber in foundation per M ft.	30.00	35.00	65.00	40.00	..
100 cu. yds. extra excav.	1.50	1.00	1.00	1.00	.40
Rock excav., per yd.	1.65	1.65	1.00	1.65	3.00

WATER SUPPLY

Montgomery, Ala.—At weekly legislative meeting of Board of City Commissioners matter of purchasing additional electrical air compressor for city water works plant was taken up for discussion.

Alhambra, Cal.—Question of water works is being considered, but nothing definite has been decided.

Los Angeles, Cal.—Board of Supervisors will receive bids for franchise for 40 years to maintain a system of water pipes in portions of Los Angeles County.

San Diego, Cal.—Mayor Jas. E. Wadham is said to be in favor of purchasing plant of Southern California Water Co.

Hartford, Conn.—Citizens have voted in favor of water bond issue.

Salem, Ill.—Plans will shortly be prepared for installation of waterworks system to cost about $70,000.

Indianapolis, Ind.—On recommendation of Fire Chief Coots Board will ask Board of Public Works to order 1,500 ft. of water mains in Belmont ave., south of Washington st.

South Bend, Ind.—Petition for construction of water mains on Michigan st. from Ewing to Donmoyer aves. has been filed with Board of Public Works.

Gloucester, Mass.—Water Commissioners have voted to call for bids for carload of small pipe between 1 and 2 in. in diameter.

Jamestown, N. Y.—Board of Water Commissioners has ordered construction of 5,000,000 gallon water reservoir on English hill in south part of city and rebuilding of water mains so as to make it principal source of supply, water being pumped there direct from artesian wells at Levant from which city water is now taken. Work will cost $100,000 and will be pushed to completion speedily.

Rochester, N. Y.—Town Board of Irondequoit has granted important franchise rights to Rochester & Lake Ontario Water Co. to extend its mains through many thoroughfares in township. Proposed extensions of company, amounting to about $100,000, have been financed.

Schenectady, N. Y.—Common Council has adopted ordinance authorizing construction of one-unit water storage reservoir of 10,000,000 gallons capacity, to cost $300,000, vote being 10 to 2.

Schenectady, N. Y.—Ordinance is being considered for erection of storage reservoir system of one unit with capacity of 10,000,000 gallons, approximate depth to be 20 ft., construction to be of concrete, on lands in town of Niskayuna owned by Mohawk Golf Club and Bevis estate, to be acquired by city in customary manner. Distributing system to be established comprises construction of following mains: A 30-in. cast iron main from the reservoir to Van Antwerp road, thence along the same road to Union st., thence to Palmer ave., thence through that avenue to Eastern ave., thence to Brandywine ave. A 24-in. main through Brandywine ave., from Union st. to State st.; also in Union st., from Nott terrace to the end of the present 12-in. main near Morris ave. Plans and specifications are

to be prepared by Board of Contract and Supply and bids for construction work advertised for in usual way. To defray expense of constructing reservoir and completing system ordinance provides for issue of bonds to amount of $200,000, to bear interest at 4½ per cent., and to mature at rate of $50,000 a year. Proposed ordinance will be taken up at next meeting of the Common Council.

Mount Vernon, Tex.—City has voted $20,000 bond issue for construction of water works.

St. Albans, Vt.—It has been voted to issue bonds to amount of $60,000 to be used to repair dams at reservoirs and eliminate waste by installing meters; also to acquire and develop Silver Lake and connect with lower reservoir.

Medical Lake, Wash.—Allen & Wells, of Spokane, were successful bidders for Medical Lake water refunding bonds, bids for which were opened by City Council. Spokane men will take entire $15,000 issue bearing 6 per cent. interest.

Seattle, Wash.—Plans have been approved for water mains on N. 66th st.; estimated cost $3,300.

Seattle, Wash.—Ordinance has been passed providing for improvement of Latona ave., from Woodlawn ave. to E. 85th st., by constructing water mains therein of proper dimensions and materials, together with all gates, tees, crosses, fire hydrants and other appurtenances necessary for proper water service and fire protection of said district; also ordinance authorizing Mayor and City Comptroller to issue local improvement bonds for improvement of 26th ave. Northwest, from W. 75th st. to a point 583.67 ft. north of W. 80th st., by constructing water mains.

Walla Walla, Wash.—Preliminary sketches of 20,000,000 gallon reservoir, which will probably be submitted to voters for bonding next spring, are being made by City Engineer Walter R. Rehorn.

Kimball, W. Va.—Fifty-year franchise has been acquired by Russell Co. of Dayton, O., for water works and electric light plant.

Montreal, Que., Can.—Appropriation of $300,000 has been recommendd by City Controller for water works department for year's budget.

CONTRACTS AWARDED

Birmingham, Ala.—For boring of 8-in. well for use of city's water plant, to Hughes Specialty Well Drilling Co., at $3.40 per ft, for an 8-in. well at minimum depth of 400 ft., at total cost of $1,400, and at same price until depth of 800 ft. charge of 50 cents per ft. to be charged.

Exeter, Cal.—For water works to include laying approximately 8 miles of mains and erecting 100,000 gallon hemispherical bottom steel tank and tower, to C. D. Vincent, Oakland, $31,592. Other bids as follows: Chambers & Heafy, San Francisco, $31,995; C. F. Braun & Co., San Francisco, $32,100, and Western Engineering & Water Supply Co., San Francisco, $32,563. The tank and tower will be furnished by the Des Moines Bridge & Iron Co., of Des Moines, Ia.

Alamosa, Col.—To Marshall Bros., by town, for construction of water works system; estimated cost $10,000.

Reidsville, Ga.—By City to B. F. Roberts, Macon, Ga., to construct water works.

Tremont, Ill.—To A. D. Thompson, Peoria, Ill., by Board of Local Improvements, for construction of about 14,500 ft. of 4 to 8-in. c. i. water mains with necessary appurtenances, at $8,327.

Indianapolis, Ind.—By Board of County Commissioners for supplying water to jail and Court House for one year, to Indianapolis Water Co., at $2,350.

Audubon, Ia.—For completing artesian well for water works, to J. P. Miller Artesian Well Co., Chicago, Ill.

New Orleans, La.—By Executive Committee of Sewerage and Water Board, to National Lead Co., of St. Louis, for 500,000 pounds of lead pipe, price amounting to $24,850, and 15,000 pounds of solder, price amounting to $3,075.

Independence, Mo.—By Board of Commissioners of Jackson County, to Interurban Water Co., Independence, for construction of pipe line from Independence, Mo., to county farm.

Mountain View, Okla.—By City to Kennedy & Fleming, State National Bank Building, Oklahoma City, Okla., to improve water system at cost of $15,600.

Olustee, Okla.—By City to E. D. Lundsen, Oklahoma City, Okla., to construct water works; water to be supplied by deep well and Turkey Creek.

Norfolk, Va.—By Board of Control, to Water Works Supply Corporation of Norfolk, for 250 tons of crushed rock, at $1.38 a ton.

Seattle, Wash.—By City, for generator set for Masonry Dam power plant, to Fort Wayne Electric Works, at $8,396.50.

BIDS RECEIVED

Fort Mason, Cal.—For constructing two additional filters in pumping station at Presidio of San Francisco, Cal., as follows: (a) two steel filters, (b) two wooden filters, (c) two high-type steel filters, (d) two high-type wooden filters, (e) piping: C. F. Braun & Co., 503 Market st., San Francisco, (a) $7,850, (b) $6,180, (c) $9,055, (d) $6,700, (e) $1,190; Pringle, Dunn & Co., 338 Pine st., San Francisco, (e) $1,286; Stevens & Stanbraugh, 947 Bush st., San Francisco, (e) $2,523; M. Sissenwine, 820 Merchants' Exchange, San Francisco, (a) $13,630, (b) $12,370.

LIGHTING AND POWER

Redlands, Cal.—At meeting of Imperial Valley Gas Co. new bond issue of $500,000 was voted to provide for extension of system in valley.

Stockton, Cal.—People of Stockton, through committee of Stockton Merchants' Association have decided to recommend to City Council that it shall call special election to enable voters to authorize issuance of bonds to finance construction of conduits for electric light system in downtown district.

Vallejo, Cal.—Prof. C. L. Corey, head of electrical department at University of California, who had been employed by city to give expert opinion on value of Vallejo Light & Power Co., to report to City Council, has advised city to pay $115,000 for plant as it stands.

Bridgeport, Conn.—At its meeting Committee on Lamps voted to put in requisition to Board of Appointment for 46 additional arc lights, at cost of $3,273.82.

Delmar, Del.—Town Council of Delmar has renewed present street lighting contract with the Sussex Light & Power Co. for term of 5 years. Contract price of each light is increased $2, with understanding that company is to install new lighting system that will increase present lights fully one-third, making streets better lighted than they have been in the past.

Seaford, Del.—Town Council of Seaford at special session called to discuss refusal of Sussex Light & Power Co. to contract with town for one year, agreed to terms of company and signed another contract for 5 years.

Albany, Ga.—Chamber of Commerce, with co-operation of City Council, is looking into matter of establishment of a great white way.

Atlanta, Ga.—Erection of municipal lighting plant of 5,000 horse-power capacity at Hemphill water works pumping station has been recommended by City Electrician, R. C. Turner.

Indianapolis, Ind.—Board of County Commissioners has decided that the county can save money by closing county power plant, and has awarded contracts to private corporations for supply of heat, light, water and power at jail and Court House for next year.

Galvey, La.—Bond issue has been voted for construction of electric light plant.

Springfield, Mass.—Bond issue of $50,000 is being considered for lighting purposes.

Virginia, Minn.—By resolution Virginia Electric Power & Water Co. was requested by City Council to give Council company's lowest cash price for plant within 20 days; also state whether company will accept 5 per cent. bonds of city in lieu of cash; purchase to be immediate.

Atlantic City, N. J.—Public Utility Commission has approved proposed issue of $170,500 worth of 5 per cent. first mortgage gold bonds by Atlantic City Gas Co. for improvement and extension of its plant.

Dover, N. J.—Matter of lighting main thoroughfares entirely by arc lights instead of by present incandescent lamps and arcs was discussed informally at meeting of Common Council.

Perry, N. Y.—Movement has been started by taxpayers to bond village in sum not exceeding $15,000 for purpose of installing and equipping new municipal electric plant to supply village with modern lighting system for streets. Petition to this effect has been signed by required number of taxpayers and will be presented to village board at its next meeting.

Schenectady, N. Y.—Special committee has recommended that city endeavor to secure through legislation authority to establish municipal lighting plant.

Toledo, O.—Resolutions have been passed for improving by electric lighting Junction ave. and Pinewood ave., Collins st. and Scottwood ave., Stickney ave. and Woodward ave.

Harrisburg, Pa.—Ordinance has been passed for placing of electric lights on various streets.

Hamilton, Va.—Franchise for 30 years has been granted by Town Council to E. A. Cockey, Jr., to construct electric light system.

Kimball, W. Va.—Fifty-year franchise has been acquired by Russell Co. of Dayton, O., for electric light plant and water works.

CONTRACTS AWARDED

Patton, Cal.—For erecting power house on grounds of Southern California State Hospital, to F. M. Walton, of Hollywood, for $11,445.

Washington, D. C.—For electric work to be installed in Eastern High School, to Carroll Electric Co., Washington, for $3,100.

Indianapolis, Ind.—By Board of County Commissioners, for heating and lighting of jail and Court House for one year, to Merchants' Heat & Light Co., at $13,989.24.

Enfield, N. C.—By City, to A. D. O'Brien, of Wilmington, for constructing electric light plant for about $10,000.

Wildwood, N. J.—By Wildwood Council, for wiring of new boardwalk, to Kalbach Bros., on bid of $1,997.

Rochester, N. Y.—By Board of Contract of Supply for electric wiring and power for new incinerating plant to Rochester Railway & Light Co., at 2 cents per kilowatt.

Hamilton, Ont.—By Hydro-Electric Board, to Standard Underground Cable Co., contract for 165,000 ft. of wire, to be used in construction of new system, for about $26,000.

FIRE EQUIPMENT

Alameda, Cal—Election will be held for voting on bond issue for purchase of motor apparatus.

Somerville, Mass.—Installation of motor apparatus is recommneded by Finance Committee.

Camden, N. J.—City Council is considering erection of up-to-date fire house in East Camden.

Jersey City, N. J.—Erection of fire house at Manning and Johnston aves. is being considered.

Montclair, N. J.—Purchase of auto combination chemical and hose wagon is recommended.

Morristown, N. J.—Plans for further improvement of fire department are being discussed.

Summit, N. J.—Purchase of auto hose wagon for Hose Co. No. 1 has been recommended to Common Council by Board of Fire Chiefs.

Buffalo, N. Y.—Installation of combination hose wagon and motor driven engine is being considered.

Herkimer, N. Y.—Fire Chief and Fire Commissioner are considering purchase of automobile fire truck.

Rochester, N. Y.—Work on new fire house at Dewey ave. and Bryan st. is now made possible by appropriation made of $22,803.50 by Board of Estimate and Apportionment.

Dayton, O.—Purchase of three auto hose wagons is being discussed.

Lakewood, O.—Bonds in sum of $15,000 are being issued for installation of apparatus and equipment.

Kenosha, Wis.—Plans are being prepared for erection of fire engine house on West Side.

Superior, Wis.—Appropriation has been asked for purchase of auto engine.

Winnipeg, Man., Can.—Bids are being received on 5,000 ft. cotton rubber lined 2½-in. hose.

Montreal, Que., Can.—Appropriation of $483,000 has been recommended by City Controllers for fire department for year's budget.

CONTRACTS AWARDED

Trenton, N. J.—For furnishing 2,400 ft. of 2½-in. double jacket fire hose, to United & Globe Rubber Manufacturing Co., at $1 per ft., and 2,400 ft. of 2½-in. double jacket fire hose, to Empire Rubber Manufacturing Co., at $1 per ft.

Rochester, N. Y.—For motor driven combination chemical and hose wagon for fire department, by Board of Contract and Supply, to Strong-Crittenden Co., of Rochester, on bid of $5,221.

Montreal, Que., Can.—For erection of police and fire station on Marechal st. to Contractor Joseph Marcotte, 565 St. Antoine st., at $62,000.

BRIDGES

Jacksonville, Fla.—County Engineer at meeting of Commissioners was instructed to draw plans and specifications for concrete bridge with steel draw over Trout Creek, at the crossing of the Lem Turner road, the same to be submitted to the Board at a meeting to be held Feb. 16, 1912.

Boston, Mass.—Council has referred to Finance Committee recommendation from Mayor for $175,000 additional for Chelsea north bridge.

Saginaw, Mich.—Plans are being prepared for steel bridge with 180 ft. span over Swan Creek, at cost of $10,000.

Arlington, Neb.—Washington County wants one bridge over Elkhorn, near Arlington, to cost $10,000.

Bridgeport, Neb.—Morrel County wants two bridges over North Platte, one near Bayard and other near Bridgeport, each estimated to cost $20,000.

Butte, Neb.—Application has been made for joint bridge from Boyd and Holt counties over Niobrara River; estimated cost $25,000.

Cedar Rapids, Neb.—Erection of bridge over Cedar River has been authorized.

Monroe, Neb.—Platte County wants bridge over Loup River to cost about $34,000.

North Bend, Neb.—Lodge and Saunders Counties combined want State to aid in bridging troublesome Platte at North Bend. It is estimated structure will cost $68,800.

Fulton, N. Y.—Board of Public Works will meet to discuss contract for city's part of proposed Broadway bridge.

Columbus, O.—Bids will be received until 12 noon, Jan. 4, at office of Board of Commissioners of Franklin County, for purchase of $6,000 emergency bridge bonds for reconstruction and repair of following bridges and bridge approaches: Black Lick bridge of the Granville road, Black Lick bridge on the McGuffy road, Black Lick bridge on the Havens road, Clickinger Scioto River bridge, Black Lick bridge on Havens road, McKinley bridge over Big Darby, approaches Chillicothe pike, Big Walnut bridge, east approach Lockbourne Big Walnut Creek Bridge, bridge over Indian Run, culvert at Long farm 1 mile northeast Central College, Westerville bridge over Alum Creek, culvert over Gay Run on Georgesville and Harrisburg road, bridge over Rocky Ford on Gahanna and New Albany road, Swickard bridge on State road, county bridge over Alum Creek, Dehner bridge over Big Walnut, Black Lick bridge South Reynoldsburg, Worthington Olentangy bridge.

Dayton, O.—Plans and estimates for proposed new Keowee st. bridge, providing for construction of which ordinance has been given its second reading, and will doubtless be passed at special session of City Council. The specifications, as drafted, will cost approximately $65,000.

Harrisburg, Pa.—Common Council has passed resolution instructing Highway Commissioner to repair and place in safe condition bridge over Paxton Creek on Mulberry st., provided it is property of city, and, if property of county, to immediately notify County Commissioners of its condition.

Phoenixville, Pa.—At cost of more than $30,000 the County Commissioners of Montgomery and Chester counties will in near future erect steel bridge across Schuylkill River at Pawlings, near Perkiomen Junction, to replace ancient structure now at that place which was condemned several weeks ago.

Chattanooga, Tenn.—Viaduct of reinforced concrete arches, to cost approximately $130,000, was decided upon by Commission of Engineers, and recommendations to this effect will be made city and railway officials.

Seattle, Wash.—Plans have been approved for reinforced concrete viaduct on Fremont ave.; estimated cost $47,000.

Ottawa, Ont., Can.—Board of Control recommends approval of plans which call for steel bridge, on Bronson ave., to cost $82,000.

CONTRACTS AWARDED

New Castle, Ind.—By Board of Henry County Commissioners, to H. F. Burke, city, for construction of eight concrete bridges.

Council Bluffs, Ia.—To Lana Construction Co., of Harlan, for constructing steel and wooden bridges in Pottawattie County during 1912, at about $40,000.

Saginaw, Mich.—To W. V. Sager, Bay City, Mich., for construction of lift bridge at Johnson st.

Castle Hayne, N. C.—By Joint Committee of Boards of County Commissioners of New Hanover and Pender counties, for furnishing material and constructing highway bridge across Northeast River, near Castle Hayne, to Virginia Bridge & Iron Co., of Roanoke, Va., for $39,468.

Castle Hayne, N. C.—By Commissioners of Hanover and Pender Counties for construction of steel bridge over Northeast River to Virginia Bridge & Iron Co., Roanoke, Va., at $39,448.

Wilmington, N. C.—By Commissioners of New Hanover and Pender counties, for construction of bridge over Northeast River, near Castle Haynes, to Virginia Bridge & Iron Works, at $39,448.

Roswell, N. M.—By County Commissioners, for new bridge over Salt Creek, to L. R. Cullen, of Roswell, at $518.20.

Fulton, N. Y.—To Lou B. Cleveland, Cleveland Bldg., Watertown, N. Y., at $125,785, for construction of bridge at Fulton.

Massillon, O.—By Board of Commissioners of Stark County, to Massillon Bridge & Struct. Co., Massillon, at $9,930, for construction of lift bridge over Ohio & Erie Canal at Massillon.

Miamisburg, O.—By Board County Commissioners at Dayton, for furnishing material and constructing hand lift bridge over Miami & Erie Canal at Smith st., Miamisburg, to A. S. Fox, of Dayton, for $7,829.

Bendersville, Pa.—By Commissioners of Adams County, Gettysburg, Pa., to York Bridge Co., York, Pa., at $1,544, for erection of two-span structural steel bridge, with wood floor, over Opossum Creek, in Menallen Township.

MISCELLANEOUS

Lodi, Cal.—There will be more than quarter of million dollars spent in this immediate vicinity for public improvements in next few months.

Lodi, Cal.—At meeting of City Trustees City Clerk McMahon presented plans for New City Hall, which is to be erected on lot that city bought from former water and light company on N. Main st.

Woodland, Cal.—Meeting of Supervisors will be in session for purpose of determining whether or not voting machines will be used in future elections.

Hartford, Conn.—State of Connecticut has sold $4,000,000 issue of bonds, bearing interest rate of 4 per cent., to R. L. Day & Co. and Esterbrook & Co., of Boston.

Wilmington, Del.—City Councils will build City Hall independent of Court House.

Washington, D. C. — Supplementing previous report, which was published as foreign trade opportunity No. 7696, American Consul reports that local government is now engaged in repairing certain roads in his district. Road construction will be under charge of certain official, but Consul states it would be preferable to have catalogues, price lists, and all correspondence sent direct to him. One or two traction engines with an equipment of several cars and water tank and stone crusher are especially desired. No. 7819, Bureau of Manufactures.

Jacksonville, Fla.—Entire bond issue of 1911, amounting to $250,000, was awarded to firm of N. W. Halsey & Co., of New York, whose bid, $255,625, was highest received by Board of Bond Trustees.

Champaign, Ill.—City Council has begun preliminary plans for establishment of city market similar to one at Indianapolis.

Fort Wayne, Ind.—Citizens will shortly be called on to vote on proposed issue of $200,000 of bonds for purchase of river frontage through city for city improvement.

Des Moines, Ia.—City Council has decided to erect municipal market building, to cost $50,000.

Leavenworth, Kan.—E. W. Geiger has been awarded special improvement bonds amounting to $10,912.88.

Boston, Mass.—Council has decided to investigate matter of purchasing new playground site in Mattapan. Mayor recommended $25,000 for this purpose.

Boston, Mass.—Council has voted to transfer from reserve fund some $333,450 for various improvements. Amount included $50,000 for playground in Ward 2, $50,000 for branch library in East Boston, $90,000 for municipal building in Ward 7, $9,000 for bathing beach at Freeport st., Dorchester; $20,000 for shelter and boat landing, Jamaica Pond; $2,200 for temporary quarters, East Boston Court; $3,000 for ambulance, East Boston Relief Hospital; $9,000 for new wall, Dorchester north burial ground; $250 for tablet for the Parkman homestead; $10,000 for Mystic playground and sea wall; $24,000 for bathhouse at Dewey Beach; $6,000 for floating baths at Fort Point channel; $20,000 additional for municipal building in South Boston; $15,000 for playground, Ward 25, and $25,000 for playground in Ward 23.

Taunton, Mass.—Installation of police signal system and purchase of automobile for use of department have been recommended.

Lansing, Mich.—Board of Supervisors of Alcona County will convene at once and take steps to build new county jail.

Hastings, Minn.—Bids are being taken for remodeling, etc., of court house; cost $30,000.

Booneville, Mo.—Bids will shortly be taken for erection of court house to cost about $100,000. Plans by Architect R. G. Kirsch, St. Louis.

Collingswood, N. J.—Appropriation is being considered for installation of up-to-date police telephone system.

Binghamton, N. Y.—Session of Board of Estimate and Apportionment has been held for purpose of approving ordinance passed by Common Council allowing Police Commissioner Goldsmith to buy automobile police patrol without advertising for bids. Ordinance was unanimously approved.

Elmira, N. Y.—Board of Supervisors has authorized plans prepared for brick north wing to county hospital.

Herkimer, N. Y.—Board of Supervisors considered as special order report of Committee on Tuberculosis Sanitorium in Herkimer County, report including resolution favoring establishing of such institution.

Newburgh, N. Y.—Award of $189,000 worth of coupon bonds of Orange County have been made to E. H. Rollins & Son, of Boston, whose bid was $103.29.

Olean, N. Y.—Erection of a municipal building, at cost of $100,000, is contemplated.

Rochester, N. Y.—Board of Contract and Supply will authorize purchase of four compressed air flushing machines, to cost about $1,000 each.

Cincinnati, O.—County Commissioners have adopted resolution to purchase Crane-Hawley property as addition to new jail site at price of $277,500.

Cleveland, O.—Legislation preventing sale of $900,000 unsold new City Hall bonds has been advocated by Councilman Menning. With this money Menning would create fund to be used as follows: $200,000 for appropriation of lake front riparian rights; $300,000 for moving workhouse to Warrensville; $50,000 for construction of recreation pier at E. 9th st.; $250,000 for first section of new $3,000,000 city hospital; $100,000 for bath house and playground purposes.

Cleveland, O.—For third time bids on Edgewater bathhouse improvement have been rejected by City Department of Public Service. The rejection of bids was recommended on grounds of insufficient competition. Bids were $499 above estimated cost of $15,000.

Columbus, O.—Resolution has been passed calling for special election on $700,000 bond issue.

Youngstown, O.—Erection of new City Hall, to cost $50,000, is contemplated.

Pittsburgh, Pa.—Council will probably issue bonds for purchasing of additional park property.

Pittsburgh, Pa.—Allegheny County is planning extensive municipal improvements.

Pottsville, Pa.—Schuylkill County Commissioners have decided to spend $1,500 in remodeling cells and making county jail thoroughly sanitary.

Providence, R. I.—Council adopted resolution presented by Committee on Public Comfort Stations, directing that committee to submit plans and estimates of cost of two comfort stations, one in vicinity of Randall sq. and another in vicinity of Olneyville sq.

Columbia, S. C.—City Council are advertising for bids for erection of modern abattoir and refrigeratinwg plants.

Beaumont, Tex.—Citizens have voted in favor of $65,000 park bonds.

Newport News, Va.—Buildings and Grounds Committee of City Council have decided that it is impracticable to construct proposed fireproof vault in present City Hall, and instead will ask Council for appropriation of $300 with which to purchase two safes.

Richmond, Va.—Bids for purchase of $20,000 of improvement bonds of town of Barton Heights have been opened by Finance Committee, and awarded to Bumpus & Co., of Detroit, Mich.

Spokane, Wash.—Park bonds of $875,000 worth have been sold by City Commissioners to E. H. Rollins' Sons of Denver.

CONTRACTS AWARDED

Gary, Ind.—By Library Board, for erecting library, to Jas. J. Barnes, of Logansport, for $53,351.

Central City, Neb.—For erection of Court House from plans of W. F. Gernandt, Fairbury, to Eilenberger Co., of Chicago, Ill., for $91,959.

Atlantic City, N. J.—By City for furnishing lumber for boardwalk to Somers Lumber Co., figures for 1,000 ft. being as follows: 8,000 4x12 white pine at $37; same creosoted, $54.50; 8,000 2x6 white pine, $33.75; 2x6 12 ft., $33.75; same creosoted, $49.75; 8,000 2x6 cedar, sapped, $48. Other bidders were John H. Decker, Edward L. Bader and Wilbert Beaumont.

Rochester, N. Y.—By Board of Contract of Supply for alterations in police headquarters building to Dunning & Glasser, at $5,576.

Toledo, O.—For erection of asphalt plant with capacity of 1,000 sq. yds. per day, to East Iron Machine Co., of Lima. Bid for work is $8,998, which is $2 less than appropriation.

Olympia, Wash.—To White & Wright, of Olympia, to erect City Hall of reinforced concrete, at $15,631.

Vancouver, B. C.—For constructing new St. Paul's Hospital on Burrard st., to Norton-Griffiths Steel Construction Co., of Vancouver, at $323,000.

BIDS RECEIVED

New Bedford, Mass.—For collection and disposal of garbage in Fall River for term of one, three or five years, as the Board of Health may elect, were opened at meeting of Fall River Board of Health, and there were eight aspirants for the job. They were as follows: Charles F. Menard, three years, $11,780 per annum; five years, $11,780 per annum; one year, $12,000 per annum. Benjamin W. Brown, one year, $9,000; three years, $26,500, or $8,800 per annum; five years, $42,400, or $8,480 per annum. Hormidas Boudreau, three years, $30,473, or $10,157.60 per annum; five years, $50,698, or $10,193.60 per annum. James McNamara, one year, $8,995. James Braziel, three years, $31,422, or $10,474 per annum; five years, $54,990, or $10,998 per annum. W. C. Gardner, one year, $9,000; three years, $25,800, or $8,600 per annum; five years, $39,000, or $7,800 per annum. A. M. Reed, one year, $9,500; three years, $26,400; five years, $43,800. A. H. Barney, Seekonk, one year, $8,400; three years, $24,900, or $8,300 per annum; five years, $45,000, or $9,000 per annum. Lowest bidder for one year was A. H. Barney, at $8,400. Lowest bidder for three years was A. H. Barney, at years was W. C. Gardner, at $7,800 per $8,300 per annum. Lowest bidder for five annum.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREET IMPROVEMENTS	
New Jersey	Paterson	Jan. 10, 2 p.m.	Repairing roadway of bridge	Board of Freeholders.
Indiana	Terre Haute	Jan. 20, 11 a.m.	Grading and graveling roads	N. G. Wallace, County Auditor.
Ohio	ClevelandHeights	Jan. 30, noon	Paving with brick	H. H. Canfield, Village Clerk.
Indiana	Bluffton	Jan. 31, 10 a.m.	Constrn. gravel road	Boards of County Commissioners.
			SEWERAGE	
Kansas	Fort Scott	Jan. 14	Constrn. sewer system, cost $100,000	W. E. Brooks, Mayor; J. S. Worley Co., engineers.
			WATER SUPPLY	
California	Los Angeles	Jan. 15	Maintaining system of water pipes for 40 years in portion of county	H. J. Leland, County Clerk.
Missouri	St. Charles	Jan. 22	Constrn. two reinforced concrete reservoirs, 1,000,000 gallons each; also 5,000 ft. 12-in. CI pipe and appurtenances.	Carr Edwards, City Engineer.
			BRIDGES	
Nebraska	Lincoln	Jan. 8	Constrn. four bridges in District No. 1	Sanitary Board.
New Jersey	Long Beach	Jan. 15	Constrn. five trestle bridges, 6,415 linear ft.; also 3,490 sand fill	W. H. Ford, Eng., Arcade Bldg., Philadelphia, Pa.

STREET IMPROVEMENTS

Chicago, Ill.—Street bureau will be given more money, $100,000 for care and improvement of country roads within city limits, and $110,000 for purchase and erection of asphalt and creosote block paving plant.

Ottawa, Ill.—Question is being discussed for paving of certain streets in South Ottawa and East Ottawa.

Evansville, Ind.—Board of Public Works will present ordinance at special meeting asking for appropriation of $3,800 to pay for improvement of street and alley intersections.

Little Falls, N. Y.—Construction of highway from city of Little Falls to Paine's Hollow as state road is being considered.

Lockport, N. Y.—Board of Supervisors has adopted resolution presented by Supervisor Franck of this city for improvement of South Transit st. from Lincoln ave. to West ave., total length of .964 miles, as county highway, making connection with Transit road. Steps will also be taken early in year for improvement of other leading roads entering city. Expense for these improvements will be jointly borne by city and county—former to pay 30 per cent. and latter 70 per cent.

Newburgh, N. Y.—Plan is being considered for improvement of West Broadway with brick-paved roadways and parkways, making thoroughfare a beautiful boulevard.

Niagara Falls, N. Y.—Engineer Parkhurst recommends that matter of purchasing suitable asphalt repair plant in order that bituminous pavements can be properly maintained, be taken up at once.

Schenectady, N. Y.—Board of contract and supply will shortly open bids for paving of Campbell ave.

Fargo, N. D.—City council has directed city engineer to prepare plans, specifications and estimates of cost for repaving and curbing greater part of streets in Fourth Ward.

Cleveland Heights, O.—Bids will be received until 12 noon, Jan. 30, by H. H. Canfield, clerk of village, for purchase of $4,861 bonds for improvement of Ridgefield road.

Toledo, O.—Resolution has been adopted for improving Genesee st. from Paine ave. to Gock st. by grading and paving.

New London, Pa.—Commissioners of Chester County have filed with State Highway Department applications for improvement of roads in New London, West Nottingham and Franklin townships.

Philadelphia, Pa.—Movement looking to remedy of conditions of Columbia ave., between 8th and 10th sts., left unsightly by elevating of Reading Railway tracks, has been started.

Pittsburgh, Pa.—Widening and extension of certain downtown streets and improvement of water front will be discussed shortly.

Denison, Tex.—Ordinance is being proposed providing for paving of Main st. from end of present paving east to Travis ave.

CONTRACTS AWARDED

Marion, Ind.—By county commissioners three road contracts, John W. Slater, of Matthews bidding in all below estimates. Three roads and bids at which construction was let follow: Harvey Jay road, $5,250; Newt Harris road, $1,145; David Harris road, $11,440. Three road contracts comprise chain of roads in Franklin and Mill townships.

Schenectady, N. Y.—For paving of Campbell ave. with sheet asphalt from end of present pavement to city line to Union Paving Co. Meeting of board of contract and supply received three bids for the work, as follows: Schenectady Contracting Co., $39,740; bid of Warren Bros. Co. of Boston was $40,730.20, and that of Union Paving Co. was $39,688.10.

Strathcona, Sask., Can.—To Bitulithic & Contracting Co. for 70,000 yards of paving at $2.85 and 60,000 yards to the National Paving & Concrete Co., of Winnipeg, at same figure. Curbs and gutter will cost 85c per lineal foot. Bitulithic Co. will lay bitulithic and the National Co. will lay sheet asphalt. Contracts amount to about $500,000.

BIDS RECEIVED

Seattle, Wash.—For paving Dearborn st.: Sparger Concrete Co., $51,995.20; D. H. Trapliagen, $50,936.31; P. J. McHugh, $48,167.25; Jahn Construction Co., $50,172.05; Ind. Asphalt P. Co., $53,600.38; Sloane Bros., $48,911.20; Barber Asphalt P. Co., $53,382.95; De Flong & Heltborg, $47,760.57; T. Ryan, $46,682.25.

SEWERAGE

Vincennes, Ind.—Ordinance, ratifying and confirming revised contract between Board of Trade and Vincennes Sewer Association, which grants franchise to Sewer Association for building of complete system of sewers for city, has been read for first time at meeting of council.

New Bedford, Mass.—On recommendation of committee on roads, bridges and sewers board of aldermen voted to order sewers laid in Capitol st. from Clarks cove to Brock ave., and in Apponegansett st. from Brock ave. to Fern st., at estimated cost of $8,000; in Collette st. from point west of to point east of North Front st., at an estimated cost of $400; sewer in Bolton and Jenkins sts. from 160 ft. north of Jenkins st. to point 570 ft. west of Bolton st., at estimated cost of $2,000; and surface water drain in Bowditch st. from Belleville road to Glennon st., at estimated cost of $400.

Belleville, N. J.—Joint committee from Belleville, Bloomfield and Nutley on proposed location of Imhoff Sewage Disposal plant in Soho section of Belleville, will hold meeting. Steps will be taken to be in readiness for coming fight, to prevent the move.

Toledo, O.—Resolution has been adopted for constructing local sewer No. 1,135 in main sewer district No. 16.

Erie, Pa.—Mayor Stern has approved of resolution for recording of intercepting sewer permit issued by State Department of Health. Permit is for building of experimental sewage disposal plant at mouth of Mill Creek.

CONTRACTS AWARDED

Waterbury, Conn.—For sewers on South Leonard and Webb sts., Tower road, Randolph and Euclid aves., to John F. Keating for $8,824.

Creston, Ia.—To Rogers-Wood Co., Council Bluffs, Ia., for construction of three blocks of 12-in. sewer.

New Bedford, Mass.—By city for intercepting sewer work to J. W. Bishop Co. and to Frank A. Gammino. Bishop Co. will have contract for section 1, location A, from screen house through government reservation to end of point, to connect with outfall pipe, for $98,828. Frank A. Gammino's contract covers section 2, from screen house to Cove st., at cost of $104,243.75.